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E. H. Embley Memorial Lecture.[1]

THE EMBLEY TRADITION—EXPERIMENTATION IN ANÆSTHESIA.

By F. H. SHAW,

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WE are gathered here tonight to pay homage to a great Australian and in particular to a famous Melbournian—E. H. Embley. It was in 1902, whilst he was Honorary Anæsthetist to the (Royal) Melbourne Hospital, that he carried out his experiments in the Physiology Department of the University of Melbourne. The department was then under the direction of Professor C. J. Martin.

The fame of Embley was worldwide, as I was to discover from the following personal incident. In 1949 I was travelling in the United States, and I happened to visit the University of Wisconsin. I was introduced to an anæsthetist, who on hearing that I came from Melbourne, said: "Then you knew Embley." I explained that I only knew of him; but I thought to myself that if an American not only knew of Embley's experiments but also knew the name of his home town, then that work must indeed have impressed him.

[1] Read at a meeting of the Victorian Branch of the British Medical Association on June 1, 1960.

Now we may ask, what was Embley's contribution? I am not going to review his work in detail. Other lecturers have done that. His contribution was more than this. The sum was greater than the total. Embley was the epitome of research. Many a young research worker could well follow Embley's pattern. The desiderata of a researcher, as exemplified by the man we honour tonight, are as follows. There must first be the ability to think in terms of principles, to light a light to illume the way. But the principles must be sound. How often does the tiro mistake airy-fairiness for brilliant thought! These principles must, however, be mutable. One will not get far if one sticks to one's guns with politico-religious fervour.

Next on our list comes criticism, to which there are two aspects—the analytical and the synthetic. Criticism must first of all be destructive; but if one bends one's labours only to this task, then paradoxically one builds a brick wall, over which one cannot climb. When the wrecker has finished, the builders must move in.

So far the problem has been tackled by the brain; now the hands and eyes must play their part. Experimentation is to begin. It is useless to philosophize without being prepared to work. The young researcher must be prepared for the hard slogging, without which results will not come. Even if you cannot see your way clearly, do something; the sparks will eventually light the candle. On the other hand, a slavish, Teutonic attention to detail, totally devoid of thought, will also frustrate the beginner. But keen observations must also match manipulative skill. The

theoretical approach requires knowledge, the experimental performance requires character. Hard work, patience and perseverance in the presence of negative results, the final collection and presentation of achievements, do not come easily to all; but if one link is weak, the chain will not be forged.

Now let us look back through history to see where Embley fits into this picture. Modern anæsthetics has reached a high level of achievement; but can we really congratulate ourselves on the pace over the last 110 years? The year 1842 was only D-Day. Let us go back to minus D-Day. Nitrous oxide was first discovered in 1776. Twenty-two years later (1799), Sir Humphry Davy suggested its use in surgery. The suggestion lay unheeded for forty-three years. However, after 1842 events moved quickly (sic). Ether and chloroform were introduced. Then the Grand Schism developed. In America and Europe patients were anæsthetized with ether, and in Great Britain the majority were poisoned with chloroform. This state of affairs persisted for seventy-five years.

Certainly some work on the pharmacology of anæsthetic agents had been done before Embley started in 1902. Embley's great contribution was to join the clinic and the laboratory in an experimental approach. In his experimental work he used a total of 289 dogs. This number was used in a matter of a few years. There are many modern pharmacologists who would not use this number of animals in a decade. Then, in addition, he built most of his own apparatus.

Before commencing his work, Embley carefully reviewed the literature and the current theories. In general, the less evidence to support a theory, the more assuredly it was pronounced—especially the hypothesis (in the case of chloroform) that respiratory failure preceded cardiac failure. Embley had noticed that death usually occurred before the surgeon commenced to operate. He did not rely on impressions, but produced figures to support his claim that the early period was the dangerous one. This was his initial hypothesis, and he commenced work from here. The Hyderabad Commission had, of course, worked on the problem beforehand, both in the armchair and in the laboratory. Its members were, however, handicapped from the beginning by their lack of clinical and experimental observation. They paid little attention to the fact that most chloroform deaths were early deaths. This mistake was enhanced by an experimental technique. It was customary in those days (as it is sometimes today) to place the dog in a box and administer chloroform vapour until he was "out". The members of the commission failed to notice that many dogs died in the box (perhaps the laboratory man forgot to tell them). That is they were making no observations during the very period that was known from clinical experience to be so dangerous. Embley followed the path of classical pharmacology. He first showed that chloroform had an immediate and progressively paralytic effect on isolated heart muscle. He then considered the effects in the intact animal. He first of all tried to eliminate the "anæsthetic effect" by carrying out the initial surgical procedures under morphine alone. Then he was ready to study the effects of chloroform from the initial moments of administration. He likewise carefully eliminated or controlled many other factors before he finally showed that chloroform sensitized the heart to vagal activity, partly by increased excitability of the vagal centres, partly by peripheral sensitization at the heart. Not only was his work qualitative, but it was quantitative. He measured the concentrations of chloroform vapour which brought about the various effects and compared them with the possible concentrations in man. He also ascertained the cause of the hypotension and investigated the relationship of failure (and recovery) of respiration to blood-pressure level. There is scarcely an aspect of the problem which he did not consider. His work is an example of thoroughness.

Then we must finally ask, did Embley solve all the problems relating to chloroform in anæsthesia? The answer must be, no. This does not, however, detract from his glory. The reason is that Embley could not proceed further because all forerunners have time against them.

Perhaps one of the most remarkable omissions from Embley's work is the fact that he does not mention the cause of cardiac failure. Subsequent work in animals was to show that a high proportion of the cardiac deaths was due to ventricular fibrillation. I doubt if we can excuse Embley on the score that an electrocardiograph was not available to him. We can excuse the fact that he did not associate a proportion of the cardiac failures with the excessive liberation of adrenaline from the adrenals, because adrenaline became available, both in the laboratory and clinically, only at about the time when Embley was conducting his experiments. The identification and synthesis of adrenaline by Abel and Takamine occurred between 1899 and 1901.

Embley was also totally unaware of the theory of humoral transmission—that is, that acetylcholine provided the link between the vagus and the cardiac tissue. This conception was the work of Otto Loewi between the years 1922 and 1926. Likewise there was little other than empirical knowledge to suggest that excessive vagal inhibition might be overcome by the use of atropine.

Thus the great work of Embley could really not be brought to immediate fruition, because to do so required confirmation by facts and theories which were not yet in existence. Embley could only point out that the danger period was the initial time of induction of anæsthesia, and that one should proceed cautiously. He did show that if respiratory failure occurred, then this could be overcome if the circulation remained intact. He was unable to explain that many of the deaths were due to liberation of adrenaline, and even if he did, it was only many years later that adrenolytic substances were developed; but by this time chloroform was no longer used as an anæsthetic agent. He was also unable to provide a solid foundation for the use of atropine to overcome the excessive vagal inhibition.

From 1930 there were various attempts to introduce new volatile anæsthetic agents, culminating in the success of a solid anæsthetic (in solution)—thiopentone. However, the greatest advance was to come by the introduction of an entirely novel conception—the muscle relaxants. If we are not happy about the speed of events, at least the outcome has been very satisfactory.

Crude curare was known in the 1860's; in addition to the excellent theoretical approach of Claude Bernard, it was actually tried clinically in rabies and tetanus, but for reasons which we shall see, its use was not successful. All credit must go to the courageous work of Wright and Griffith in 1940-1942 in the introduction of this very "lethal" agent into anæsthesia. The introduction was made possible by the development of that sub-branch of pharmacology known as bio-assay. Curare is a mixture of crude alkaloids in varying proportions. It was possible to use the preparation only when it was standardized by means of the "head drop" method ("Intocostrin"). Of course, bio-assay is only a means to an end. It was not long before the chemists (King) did prepare *d*-tubocurarine and the technique was rendered much simpler.

Another interesing facet was the development of decamethonium (Barlow and Ing, Paton and Zaimis). It is interesting, because it is an example of a little-known scientific principle—namely, an incorrect theory can often lead to useful practical results. The theory, at that time, linking chemical structure and pharmacological activity was that a substance containing two quaternary nitrogens, 14 Å apart, would give maximum curariform acivity (as occurs in *d*-tubocurarine). Ing endeavoured to investigate the effect of moving quaternary nitrogens apart, in the simplest (straight chain) compound possible:

$$(CH_3)_3 \equiv N(CH_2)n \qquad N \equiv (CH_3)_3$$

Greatly to his pleasure, he did obtain maximum activity when n = 10 or 12. But these compounds (for example, decamethonium) were not typically curariform (that is, they produced fasciculation and were not antagonized by eserine). It was only later that measurement of the

membrane potentials showed that d-tubocurarine and decamethonium were members of two different classes of relaxants, non-depolarizing and depolarizing. More recent work has now shown that such a rigid classification is not correct. Indeed, modern work has shown that the neuro-muscular block can be one of depolarization, non-depolarization or a mixture of the two, or may even change from one to the other with time. This, however, is another story. It does illustrate a little-appreciated danger in pharmacology. Most people tend to reason too vigorously from analogy. In pharmacology and therapeutics one cannot extrapolate too far beyond the experimental findings. One progresses by putting one's theoretical nose in front, but this must soon be followed by the probing of the experimental finger.

I now wish to come to my final topic, which illustrates how, half a century after Embley, there can be fruitful cooperation between the scientist and the practitioner. The subject is the development of a new adjunct in anæsthesia. The substance in question is tetrahydroaminacrin, which has been given the official name of tacrine by the British Pharmacopœial Commission (and is known commercially as T.H.A.). It is a derivative of the antiseptic aminacrin, discovered by Albert and Rubbo.

The cooperation mentioned above occurred between the staff of the Pharmacology Department in Melbourne and some of my clinical colleagues, of whom Dr. K. McCaul and Dr. G. Robertson, of the Royal Women's Hospital, and Mr. V. Stone and Dr. W. Moon, of the Austin Hospital, Heidelberg, were the original workers. Since that period many others have lent their assistance, and to all these I wish to express my sincerest thanks. No matter what we do in the laboratory, it will never help mankind unless there are courageous and enthusiastic clinicians who, having carefully considered the circumstances, are prepared to undertake the risk and labour of putting the new compond to use.

About 12 years ago, my colleague Dr. G. A. Bentley discovered a series of compounds which possessed the property of producing immediate arousal of a deeply-morphinized dog. At the same time a group of American workers found another series which had the same action. However, there were two distinct differences between the two series. The substances used in America were chemically related to morphine (*n*-allyl-nor-morphine), and antagonized all the activities of morphine including the analgesia. Our substances were structurally quite different from morphine and did not antagonize the analgesia. After many years it has become evident that the mechanism of antagonism is different in each case. Two terms have been coined to distinguish this difference—"true antagonists" and "partial antagonists". The basic mode of action of both groups has not yet been worked out. The two main partial antagonists are amiphenazole ("Daptazole") and T.H.A. I do not intend to mention the work on amiphenazole, because its use with morphine in the treatment of intractable pain of terminal carcinoma has been mentioned in several recent standard works.

Tetrahydroaminacrin has shown itself to be a most interesting compound, both pharmacologically and clinically. The pharmacological actions may be summarized as follows. T.H.A. may be classed as a stimulant. In lethal doses it produces convulsions in animals, but these have not been observed in man. It stimulates the respiration (Shaw and Bentley, 1952) and antagonizes the action of curare at the neuro-muscular junction, while extending the action of succinyl choline (Gershon and Shaw, 1958). It is a powerful anticholinesterase, and has anticholine acetylase activity (de la Lande, 1958). T.H.A. awakens barbiturized (cats and mice) and morphinized (dogs) animals, and counteracts the coma of a nephrectomized kitten. On the cardio-vascular system it has little effect by itself; the blood pressure may rise or fall a few millimetres of mercury, and it may cause slight bradycardia. However, the drug can prevent ventricular fibrillation produced either by digitalis or by electric shock. It protects against the cardiac changes produced by the volatile anæsthetic agents. The actions of adrenaline and nor-adrenaline are to a certain extent antagonized. The alimentary canal is stimulated and defæcation may occur (this action is not present in man). In animals it increases the various mucosal secretions; but this action is seen in man only with excessive doses and is counteracted by atropine. The LD_{50} for rats is about 32 to 25 mg. per kilogram (Herman, Shaw and Lang, 1960).

It has no side actions other than the production of vomiting in a small number of cases (about 1%). As the intramuscular or intravenous dose in conscious volunteers increases above 30 mg., the incidence of vomiting increases. In the presence of morphine, barbiturates or general anæsthesia, the incidence is minimal.

Therapeutically it is most interesting for its great variety of uses, especally in anæsthesia, and for its lack of side actions. I shall now endeavour to indicate these uses and to offer a few comments.

The decurarization action of T.H.A. depends on its anticholinesterase activity. It is probably not quite as efficacious as neostigmin, but it does possess three advantages: (*a*) less atropine is required; (*b*) it stimulates the respiratory centre directly; (*c*) it produces an awakening of the patient. The two last-mentioned features I shall deal with later. To sum up its decurarizing properties, we may say that we now have an alternative substance to use after a relaxant of the curare type which produces additional favourable effects on the respiratory (and circulatory) systems.

Dr. K. McCaul has developed a technique for producing controlled, maximal relaxation which is readily reversible, by the combined use of T.H.A. and succinyl choline. Dr. McCaul and others who have used this technique have reported upon the early awakening and cooperative state of the patient immediately after the operation.

In respiratory stimulation and post-operative arousal, T.H.A. appears to have two very marked features which have been seen both in animal experiments and in the clinic. It has a remarkable stimulating effect on the central nervous system. This is seen particularly in its ability to stimulate respiration in man or animals when the respiration has been depressed by morphine, by barbiturates or non-specifically. T.H.A. has been used in cases of barbiturate poisoning during or after anæsthesia and in the respiratory crises that follow spinal injury. The rate and depth of respiration are enhanced in a normal manner, and breathing is not of the gasping type which one sees with nikethamide. Animal experiments have shown that T.H.A. is a very much more reliable stimulant than nikethamide. Clinical results seem to be bearing this out.

The other remarkable action of T.H.A. is on consciousness. The compound awakens morphinized and barbiturized animals and restores consciousness in the comatose nephrectomized kitten. In man it prevents or reverses morphine or barbiturate narcosis (but not in cases of long-standing poisoning), and intravenous administration at the end of an operation will soon restore consciousness. Thus the patient can return to the ward cooperative and in less need of nursing care—for example, if he should vomit there is no risk of inhalation of the vomitus.

Finally, T.H.A. has an as yet undefined "tonic" action on the heart and circulation. When it is injected into normal animals (or man) there is little or no effect on the pulse or blood pressure. It has been shown in animal experiments that T.H.A. has a considerable preventive (but not so much curative) action against various arrhythmias produced by chloroform, trichlorethylene or "Halothane". In man the first action of T.H.A. in circulatory failure is to increase the force and rate of the pulse; this is followed by a slow and prolonged rise in blood pressure. Whilst the nature of the action and the use of T.H.A. in circulatory failure in man have not been fully investigated, it can be said with certainty that its effects are beneficial.

T.H.A. has also been used to enable safe and adequate analgesia to be produced by morphine in cases of intractable pain. The use of the combination permits of an alert,

cooperative and happy patient, who is free from the possibility of addiction, and whose analgesic dose can be altered up or down as the occasion demands (Stone, Moon and Shaw, 1960). There could undoubtedly be scope for the use of T.H.A. in post-operative analgesia.

Conclusion.

In conclusion, let me again return to the point of the lecture—the Embley tradition, the union of the laboratory and the clinic. Embley had witnessed the failure of physiologists alone to conquer the terrors of chloroform. He had read the piffle of the Hyderabad Commission, on which there was not one physiologist—to wit, "the heart never stops before respiration" or "the vagus action of the heart is beneficial". He knew that he must combine experience with experiments. In the development of T.H.A. we have also combined, but not in the one person, the laboratory and the clinic.

By a coincidence, our most recent results with T.H.A. may throw light on the mechanism of the cardiotoxic effects of volatile anæsthetic agents. If we are successful, I hope we shall have done something to keep the Embley tradition alive.

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MURINE TYPHUS, MICE, RATS AND FLEAS ON THE DARLING DOWNS.

By E. H. DERRICK AND J. H. POPE,

Queensland Institute of Medical Research, Brisbane.

THE epidemic of murine typhus on the Darling Downs in 1925 (Wheatland, 1926) was unusual in several ways. Its 200 cases made it the largest outbreak of murine typhus ever recorded in Australia. It was rural rather than urban. It was associated with a plague of mice, whereas rats are the usually accepted reservoir of infection. It occurred in mid-winter, when flea activity would be least and *Xenopsylla cheopis* (Rothschild), the major vector of murine typhus, rare or absent in the area. This, and the lack of mention of insect bites, has led several reviewers to consider that inhalation was the likely mode of infection.

Toowoomba, the "capital" of the Darling Downs, is situated 80 miles west of Brisbane, at an elevation of 2000 feet. The mean temperature in July is 50·9° F. and in January 71·9° F., and the mean annual rainfall is 35 inches. Wheat is the major crop on the Downs, 15 million bushels being produced there in 1958. The wheat-producing area extends from Toowoomba about 50 miles to the south and west and a greater distance to the north-west (Figure I). Its elevation lies between 1000 and 2000 feet, and its rainfall is mostly between 25 and 30 inches. Many farmers combine sheep-raising with wheat-growing. Other grain crops—barley, sorghum, maize, oats, etc.—and also linseed are widely grown. In 1957, the population of Toowoomba was 45,900, with an additional 61,000 in the adjacent wheat area.

Murine typhus has remained endemic on the Downs. There were 27 cases notified in the three years 1948 to 1950, but only 17 in the nine years 1951 to 1959. In some cases the diagnosis was confirmed by the Weil-Felix test; in many it depended on the clinical features. The fall in the number of cases can be attributed to an energetic campaign to control rodents and their parasites.

Of the 44 patients, 30 lived in Toowoomba. (This is a much greater proportion than in the 1925 epidemic, when only four of 38 specially studied lived in the city.) The other 14 came from Dalby (4) and Bell (2), near Chinchilla, Jandowae, St. Ruth, Jondaryan, Geham, Pittsworth, Brookstead and Millmeran (Figure I). Thus the endemic area extends at least as far west as Dalby; four patients resided in this town and four more in the surrounding district. Dalby was also mentioned in Wheatland's report.

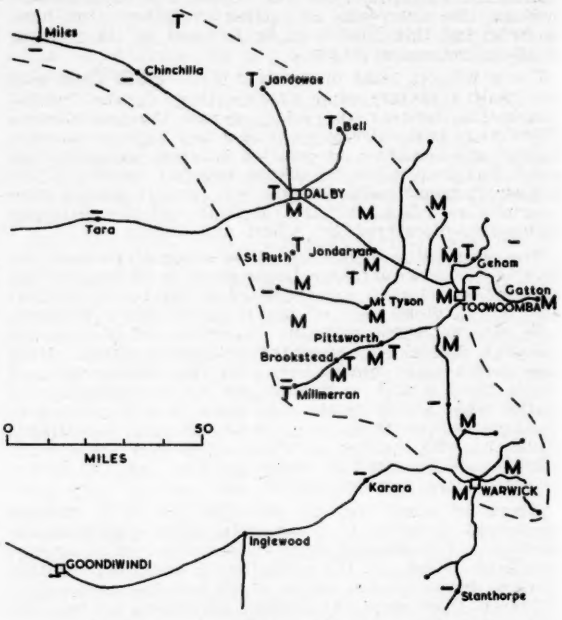

FIGURE I.

Map of Darling Downs showing a general correspondence of the areas where murine typhus is endemic, mice swarm and wheat is produced. T, site of cases of murine typhus, 1948-1959; M, swarms of mice reported, 1959; —, reports that mice were not increased, 1959. About 86% of the Queensland wheat crop of 1958 was grown in the area bordered by the broken line.

There were 33 males and 11 females. The ages ranged from eight years (a schoolgirl) to 62 years (a produce storeman). A variety of occupations was represented. Eleven patients were employed in grain or produce stores, three were farmers. With others, such as a storekeeper, baker, shunter, carrier, truck-driver, brewery worker, the occupation suggested contact with rodents. Five were housewives.

Cases arose in all months, the highest incidence being from May to July (Figure II). Thus the winter influence noted in 1925 has still been operative in recent years, but to a lesser degree. The three cases notified in 1959 all occurred in the winter—in a grain storeman in Toowoomba in June, in a carrier at Bell (source of infection unknown) in July, and in a carpenter working on a mouse-infested farm at Pittsworth in August.

Mice.

In July, 1959, reports appeared in the daily Press of hordes of mice (*Mus musculus* Linné) in many places on the Darling Downs. There were graphic accounts of roads black with scurrying mice at night, of widespread destruction of bagged wheat and millet stored on farms or in merchants' depots, of mice attacking young wheat crops, unearthing and feeding on the germinating seed, of invasion of urban homes in Toowoomba and Warwick. Many mice were seen dead; some had lumpy tails, some

were hairless. Further information was obtained from health inspectors and others. In general, the increase was first noticed in May, and the numbers began to decrease in August. However, in some places the increase was earlier, and in some the ending later. Farms were affected most, but the increase was evident also in the townships. The distribution of the swarms was uneven; as ascertained from the inquiries, it is shown in Figure I. Like the typhus cases it corresponded fairly closely to the wheat-growing area. However, the swarming was not observed in the wheat centres of Chinchilla or Miles or

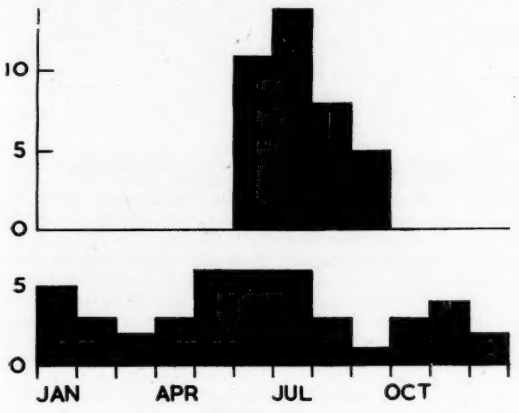

FIGURE II.

Monthly distribution of murine typhus on the Darling Downs. Upper histogram: 38 cases, 1925. Lower histogram: 44 cases, 1948 to 1959.

further west, and it extended eastward of Toowoomba into the mixed-agriculture and dairying district around Gatton, where very little wheat is grown.

Chitty and Southern (1954) discuss the factors that maintain and control populations of *M. musculus* in Britain. They consider predation to be the main controlling factor, and when it breaks down increases that may amount to plagues occur. Opportunities for predation are diminished when a food supply is close to cover. Grain is the staple food. An average mouse, feeding on whole wheat, eats 3·4 grammes daily or about 20% of its body weight. An abundant food supply will thus be necessary to support a large population. However, wheat alone is not a permanently adequate diet. Chitty and Southern noted that the mouse population in a wheat rick, after reaching a certain density, did not increase further; the rearing of young ceased. Mice feed mostly at night. They require little water. A colony is much upset by disturbance of the environment. Extremes of heat and cold are harmful, and to avoid the cold there is a general movement of mice from fields into ricks and farmhouses in autumn and early winter. A return to the fields follows in spring.

In the termination of a plague (which is usually associated with a high mortality), deficiency of diet either in quantity or in quality, disease and multiplication of enemies are reported to take part. Cleland (1918) has reported the value of some Australian birds in destroying mice.

Swarming of mice takes place each winter on the Darling Downs. The numbers in 1959 were more than in 1958, but not as many as in some previous years, and much fewer than in 1925. Swarming appears to consist of both an increase in numbers and a movement to shelter in response to falling temperatures. The first frost usually occurs in May and the last in September. With regard to potential food, wheat is sown mostly in May and June and harvested in October and November. The grain is stored in local depots until, in response to the demand, it is transported away. Much is now stored in bulk in silos, where it is protected from rodent attack; but bagged wheat, unless precautions are taken, is likely to provide a generous food supply for mice from November on and to encourage their multiplication. Barley and linseed, like wheat, are harvested in spring; maize, sorghum and millet in summer and autumn. Accessible grain storages would also supply shelter from the weather, a measure of quiet and protection from predators. Heavy rains help to control the mouse population in fields by drowning those nesting in cracks and hollows in the ground.

The swarming of mice in the winter of 1959 recalled the 1925 situation and offered an opportunity to examine mice and their parasites at the same season as the epidemic, and similarly during a swarming phase, and thus to attempt to gain a fuller understanding of the unusual features of murine typhus on the Downs. Through the courtesy of Dr. W. A. McDougall and his staff, mice were collected on a wheat farm at Mt. Tyson on July 29, 1959, and dispatched to Brisbane in straw in two kerosene tins. Some were dead on arrival; others died soon after. Partly eaten ones showed that cannibalism had occurred in transit. Simple autopsies on some recently dead did not establish the cause of death. An attempt was made to isolate infective agents from those that arrived alive by inoculating liver-spleen-kidney-heart-lung-brain into laboratory mice, and by culturing spleen and inflammatory lesions on blood or serum agar. During the next five weeks, 53 were thus examined in groups of 5 to 12. Most weighed from 9 to 16 grammes. Males and females were in approximately equal numbers. No pregnancies were observed.

Results of the examinations were as follows:

1. Gram-negative bacilli were cultured from the spleen of 12 of 41 mice. Most of these appeared healthy before sacrifice and showed no lesions at autopsy; one had pneumonia. An additional isolation was made from an abscess in a cervical lymph node of another mouse. These organisms complicated the inoculation results of seven pools, usually killing inoculated mice in about seven days, even when 1000 units each of penicillin and streptomycin per millilitre were present in the inoculum. Three strains tested conformed to the biochemical characters of *Salmonella*, and were identified by Dr. Nancy Atkinson as *Salmonella bovis-morbificans* (Basenau).

2. From two mice, *Streptobacillus moniliformis* Levaditi, Nicolau and Poincloux was isolated from inflammatory lesions in the neck and hip region respectively. The presence of this organism provided an explanation of the lumpy tails observed in the field. Three other mice examined *post mortem* had swollen feet and tails.

3. A transferable splenomegaly in mice inoculated from one pool indicated the presence of an infective agent. This has not yet been identified.

4. Cysts of a cestode, probably *Tænia tæniæformis* (Batsch), projected from the livers of five mice.

5. Abscesses of undetermined cause were seen in individual mice in the subcutaneous tissue of the neck, the thoracic cavity and the liver, and beside the rectum.

These observations show that at least two pathogenic organisms—*Str. moniliformis* and *Salm. bovis-morbificans*—were enzootic in the mice, and no doubt their incidence was increased by the overcrowding; but they do not indicate to what extent, if any, they contributed to the termination of the swarming. It is recalled that *Salm. bovis-morbificans* had previously been isolated from *M. musculus* in Queensland by Mackerras and Mackerras (1949); their infected mice were caught in a hospital in Brisbane in which were many infants infected with the same organism.

From March 15 to April 14, 1960, another series of 28 mice was obtained, by courtesy of Mr. S. E. Edwards, Chief Health Inspector, from a produce store and yeast factory in Toowoomba. Mice were then quite scanty. Sixteen were male, 12 were female, four being pregnant. Most weighed from 10 to 18 grammes. Lesions noted on

dissection were a lumpy tail and swollen ankle (from which *Str. moniliformis* was isolated) in one mouse, and a cyst, probably of *T. tæniæformis*, of the liver in two. Histological findings were small inflammatory foci in the livers of 16 mice, ova of the nematode *Capillaria hepatica* (Bancroft) in the liver of one, and the protozoon *Klossiella muris* (Smith and Johnson) in the kidneys of five.

The organs of 27 mice were grouped in 11 pools and inoculated into laboratory mice and guinea-pigs. Animals inoculated from one pool (not including the mouse with ankle and tail lesions) became infected with *Str. moniliformis*, from two pools with *Spirillum minus* (Carter), from two pools with K-virus (which Holt, 1959, had previously isolated from wild mice in Brisbane), and from four pools with a splenomegaly-producing agent or agents.

No evidence of murine typhus appeared in laboratory animals inoculated from the two series of Darling Downs mice. The sera of 80 mice were examined in 15 pools for complement-fixing antibodies to *Rickettsia mooseri*. None were found in 13 pools; the other two were anti-complementary.

Rats.

There was no mention of rats in the report of the 1925 epidemic. This does not, of course, deny their presence. Strickland (1928), in discussing the epidemic, affirmed that where there is an increase of mice, there is also an increase of rats which feed on the former. *Rattus rattus* (Linné) is present in centres of population throughout the Downs and has also been seen on farms in wheat-stacks. While in general unobtrusive, it has earned notice from time to time in the "Annual Reports of the Director-General of Health and Medical Services for Queensland". There were, for instance, excessive numbers in Goondiwindi in 1947-1948 and 1949-1950, and in the business section of Toowoomba in 1946-1947 and 1948-1949. In the last-mentioned year, wheat trucks loaded in the Dalby district were found to be rat-infested when unloaded at Rockhampton (infestation *en route* cannot, however, be excluded). Rat control measures are routinely employed in the larger centres, and many farmers regularly use "Ratsak", a hydroxycoumarin derivative, as a rat poison.

In 1959, there was a report from one place that rats were attacking mice and becoming ill, and from another that their presence at a flour mill was causing concern; but at most centres no increase in rats was noticed.

R. norvegicus (Erxleben) has not been reported from the Downs. Several native species of rats are prevalent where the original environment remains, but have tended to disappear with settlement. *R. rattus* is, therefore, the only rat to be considered in relation to murine typhus. As it is widespread on the Downs, it is likely, with its parasites, to be participating in the murine typhus cycle there. For instance a farmer with a mixed farm at Geham, who had typhus in March, 1952, and seldom left the farm, gave a clear history of rat contact. There were numerous rats in the shed in which he stored stock and poultry feed.

A series of 19 specimens of *R. rattus* was captured in a paper salvage depot and a produce store at Toowoomba between March 8 and April 5, 1960, and forwarded to Brisbane by Mr. S. E. Edwards. Nine were male, ten female, two pregnant. Their weight varied from 47 to 175 grammes. A common finding on histological examination, especially in older rats, was chronic, patchy, interstitial pneumonitis with deposition of brown pigment. Sometimes there were foci of lymphoid cells. A worm, probably a larval nematode, was present in the section of one lung, and a granulomatous nodule in another. Small inflammatory foci were often seen in the liver, less often in the kidney, brain and heart. In one liver there was a general proliferation of small bile ducts.

The pooled organs of each rat were inoculated into guinea-pigs and mice. *Hæmobartonella muris* (Mayer) was obtained from 15 rats and *Sp. minus* from five. No evidence of murine typhus appeared in inoculated animals. Complement-fixing antibodies against *R. mooseri* were not found in the sera of 12 rats (the other seven were anti-complementary) or in the sera of the inoculated guinea-pigs.

Ectoparasites.

Many dead fleas were noticed in the debris, when the wild mice of July, 1959, were removed from the containers. Probably traces of kerosene persisting in the tins were responsible for these deaths. Of the 196 fleas collected, 160 were identified as *Nosopsyllus fasciatus* (Bosc) and 36 as *Leptopsylla segnis* (Schoenherr). The high proportion of *N. fasciatus* is interesting, as this flea is rare in Brisbane. Its presence may be attributed to the cooler climate of the Darling Downs and the winter season. Mites of two genera were found on the mice—a few *Hirstionyssus* and about 200 *Mesolælaps australiensis* Hirst. Four specimens of *L. segnis*, 10 of *N. fasciatus* and 150 of *M. australiensis* were inoculated into laboratory mice, without results.

The known variation in the flea population with the seasons was the reason for obtaining the further series of mice in March and April, 1960. On these 28 mice were found eight specimens of *L. segnis* and one of *X. cheopis*, as well as 96 mites—*Radfordia affinis* (Poppe).

On the 19 specimens of *R. rattus* examined in March and April, 1960, were found 14 *L. segnis* and 37 *X. cheopis*, also one mite—*Ornithonyssus bacoti* (Hirst)—and 119 lice —*Polyplax spinulosa* (Burmeister).

The presence of *X. cheopis* on the Darling Downs is a significant observation, not previously reported.

Mode of Transmission.

It is well established that rats are the primary reservoir of murine typhus and that *X. cheopis* is the common vector. Association with this cycle can well explain the occurrence of cases on the Darling Downs in the warmer months; but the method of transmission in the winter, when *X. cheopis* is rare, invites discussion. The possible rôles of mice and fleas and the portal of entry of rickettsiæ into man call for consideration.

In general, mice have been regarded as of little importance in the epidemiology of murine typhus. However, the association of mice with the epidemic at Toowoomba in 1925 was striking, and in recent years the peak incidence of cases there has coincided with the season when mice swarm. There are also scattered observations in the literature which support the idea that in particular situations mice may play a significant part. Brigham (1937) isolated a strain of *R. mooseri* from a field mouse (*Peromyscus polionotus*) in a rural part of Alabama, where cases of typhus had developed under conditions which made the rat a highly improbable causative factor. Liu and Zia (1941) observed that a house in Peiping in which eight cases occurred was heavily infested with mice (*Mus. wagneri*), but rats were only occasionally seen. Typhus rickettsiæ were obtained from the pooled brains of four of the mice, as well as from 10 *L. segnis* collected from the mice. *R. mooseri* has been isolated from *M. musculus* in Tunis by Sparrow (1935) and in Savannah by Brigham and Pickens (1943).

With crowded populations of mice, one would expect pathogenic organisms in them to spread and develop a high incidence, and we may assume with Burnet (1942) that this occurred with *R. mooseri* during the termination of the mouse plague in 1925. Each winter swarming would be liable to create foci of raised infectivity. It is very likely that mice have continued to participate significantly in the reservoir of typhus infection on the Downs. However, we were unable to provide direct proof of this by demonstrating *R. mooseri* or serum antibodies in the two small series of mice examined.

X. cheopis does not thrive in cold climates. The opinion that it is rare on the Downs in winter is based on (i) its absence from the 386 fleas collected from mice there in winter by Strickland (1928) and ourselves, and (ii) on the mean July temperature in Toowoomba being 3·5° F. colder than that of Sydney, where systematic studies of

fleas on rats have shown *X. cheopis* to be at a minimum in winter (Morgan and Mackerras, 1928).

Strickland collected 190 fleas, all *L. segnis*, from 131 mice, and we found both *L. segnis* and *N. fasciatus*. *R. mooseri* will multiply abundantly in both these fleas (Mooser and Castaneda, 1932). *N. fasciatus* can transfer murine typhus from rat to rat and will attack man on occasion, but the absence of human infection in regions where rats abound and *N. fasciatus* is their predominant flea suggests that it rarely, if ever, transfers infection to man. *L. segnis* has occasionally been found naturally infected—in Athens by Lepine *et alii* (1932) and in Peiping by Liu and Zia—but does not attack man.

It is noteworthy that no evidence of flea bites appears in the records of Australian outbreaks of murine typhus. This may perhaps be explained in part by unawareness of the bite or by failure to recall it afterwards. But Saint *et alii* (1954) questioned a group of Perth patients closely. Not only was there no memory of flea bites, but two patients allergic to fleas were adamant that they had not been bitten. Saint, like Bull in Adelaide much earlier (Hone, 1927), was impressed by the frequent history of exposure to dust in rat-infested premises, as from demolition of buildings or sweeping café floors, and so considered it likely that many patients were infected by the respiratory route. *R. mooseri* can also penetrate through the conjunctiva.

The most likely way for infective aerosols to form would appear to be from flea fæces. It is recalled that the infectivity of *X. cheopis* resides mainly in the fæces. *R. mooseri* is not inoculated into man or animals by the bite. Infective fæces are ejected by the flea at the time of biting, and these or the crushed body of the flea may be rubbed into the bite wound. (Rats may become infected by ingesting fleas.) Fæces probably remain infective for the life of the flea, and there is evidence that *R. mooseri* in flea fæces, if kept dry, may survive for a considerable time. Infectivity of fæces probably holds also with the other flea species, although it does not appear to have been reported. Mooser (1960) notes that fleas on rodents eject their liquid fæces in the form of a jet up to the tips of the hairs, especially on the neck. The reason for this is that the gut of the flea terminates on the dorsal side of the hind part of the body. The fæces dry immediately to become a fine loose powder, which is easily shaken off.

Possible, but unlikely, sources of aerosols are the fæces and urine of mice or rats. No reference to *R. mooseri* in rodent fæces has been found. As regards urine, Mooser (1960) comments:

> I do not believe that the urine of rodents plays a significant role in the transmission of murine typhus to man. The agent is only excreted during the acute phase of the infection which lasts only a few days.

Rickettsiæ in urine or fæces are not likely to survive more than a few hours.

The occurrence of murine typhus on the Darling Downs in winter could, therefore, be explained by a reservoir of infection in mice, contamination of the environment by the excreta of their fleas, and inhalation by man of infected dust.

Strickland (1928) suggested that the lælaptid mite, *M. australiensis*, which he, like ourselves, found on the mice, might be the vector of typhus on the Downs. There is, however, no evidence that this mite attacks man, and Mooser and Castaneda (1932) reported that an allied lælaptid mite, *Lælaps echidninus* Berlese, was unable to transmit the disease; it did not become infected in spite of prolonged contact with infected rats.

Summary.

Murine typhus has remained endemic in Toowoomba, in Dalby, and generally in the wheat-producing area on the Darling Downs since the epidemic of 1925. Human infection has, however, been very infrequent in recent years.

Swarming of mice (*Mus. musculus*) occurs each winter in the wheat area. In some years, as in 1925, the enormous numbers have merited the term "plague".

Rattus rattus is widespread in the endemic area. Cases of typhus occurring in the warmer months can be explained by association with the rat-*Xenopsylla cheopis* cycle.

The fleas *Nosopsyllus fasciatus* and *Leptopsylla segnis* were abundant on *M. musculus* captured in winter. *X. cheopis* and *L. segnis* were present on *R. rattus* and *M. musculus* in autumn.

An unusual feature of murine typhus on the Darling Downs, noted both in 1925 and recently, is that the peak incidence is in winter, when mice are numerous and *X. cheopis* is rare. A proposed explanation for winter cases is that mice provide a reservoir of infection, and that man becomes infected by inhaling dust contaminated by the excreta of their fleas.

Rickettsia mooseri was not isolated from 80 *M. musculus* and 19 *R. rattus* tested; nor were specific antibodies to it detected in their sera.

Other ectoparasites found on the mice were the mites, *Mesolælaps australiensis*, *Radfordia affinis* and *Hirstionyssus* sp., and on the rats the mite, *Ornithonyssus bacoti*, and the louse, *Polyplax spinulosa*. No infective agent was obtained from four specimens of *L. segnis*, 10 of *N. fasciatus* and 150 of *M. australiensis*.

Infections with *Salmonella bovis-morbificans*, *Streptobacillus moniliformis*, *Spirillum minus*, K-virus, an unidentified agent causing splenomegaly, *Klossiella muris*, *Capillaria hepatica* and a liver cestode were observed in the mice, and with *Sp. minus*, *Hæmobartonella muris*, and a lung worm in the rats.

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THE EARLY DETECTION OF CERVICAL CARCINOMA BY CYTOLOGY, AND ITS MANAGEMENT.

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EVIDENCE is accumulating that carcinoma of the cervix, second only to carcinoma of the breast as the cause of death from malignant disease in women, has a variable period of months to many years when it remains in the pre-invasive phase. Its detection and treatment in this stage result in almost certain cure, whereas once invasion occurs, the mortality from this disease, in spite of modern methods of treatment, rapidly increases. Until such time as a cure for cancer even in the advanced stage is discovered, its early detection before invasion occurs offers the best chance of eradicating this disease.

This fact has been recognized for many decades—that if carcinoma of the cervix could be discovered at a very early stage, then the chances of cure must be increased. Hinselmann (1925) examined the magnified cervical epithelium for breaks in the surface, and from this beginning the colposcope has been developed. Schiller (1933) used iodine to localize areas for biopsy. Random punch biopsies, quadrant biopsies, endocervical curettage, have all been used in an attempt to discover these early cases. These methods, although extremely helpful, were limited in their use, and it was Papanicolaou and Traut's monograph in 1942 which gave a simple method that could be used by any physician in association with the laboratory in the early detection of carcinoma of the cervix.

Papanicolaou first began the study of vaginal smears in the female guinea-pig over 40 years ago, and gradually developed the technique to include the study of the menstrual cycle in women. The first large-scale study was carried out at the Women's Hospital of New York City in 1923. This examination was extended to patients with different pathological conditions, including cancer. Papanicolaou reported: "The first observation of cancer cells in a smear of the uterine cervix was one of the most thrilling experiences of my scientific career". These early studies were reported in 1928 (Papanicolaou, 1928), but received scant attention. Some years later, as the result of a more extensive investigation covering three years and reported in 1943, the usefulness of exfoliative cytology began to be recognized, and it rapidly spread throughout America and to many other countries where it has become firmly established. Very little has appeared in the Australian literature on this method, and this is an attempt to give the present potential of exfoliative cytology and to record some of my experiences over the past three years in its use as an adjunct to normal gynæcological examination.

How Does Cytology Work in the Detection of Carcinoma?

The basis for the use of cytology lies chiefly in the fact that there is a continuous shedding of cells from the surface of all epithelial linings, which is usually more copious in cancer as a result of the high proliferative activity of the malignant cells. Exfoliated cancer cells may thus be observed in smears even in the very earliest and microscopic stages of a malignant lesion, before invasion has occurred or symptoms have appeared. The exfoliated cells collect in the posterior vaginal fornix, remain well preserved for some time and are there to be picked up and recognized by the smear method. To obtain a more concentrated smear for study, various techniques have been developed for obtaining the surface cells by scraping the suspected areas of epithelium.

Method of Taking Smears.

Papanicolaou in his early studies examined specimens of the vaginal pool by aspirating this material with a glass rod and suction bulb. Cells exfoliated from the upper part of the vagina, the cervix, the endocervical canal and the uterine cavity may be detected in such smears. Much of the original work was done by this method, until Ayre (1947) published his method of taking a scraping from the cervix with a wooden spatula. This gives a greater concentration of abnormal cells if the lesion is in that area of the cervix. Other methods, such as the use of an endocervical swab or aspiration and endometrial aspirations, are useful when the lesion is suspected in one of these places.

The advantages of the methods are their simplicity and availability to all practitioners wherever they may practise. A smear may be taken in the consulting room and mailed to the cytological laboratory, where expert interpretation can be given and the result returned to the doctor without any great expense or the need for much equipment.

The three methods commonly used are as follows: (i) aspiration of the posterior vaginal pool with a glass rod and suction bulb; (ii) scraping the squamo-columnar junction of the cervix with Ayre's spatula, or with a wooden tongue depressor, either whole or split longitudinally in half; (iii) endocervical swabbing with a cotton-wool tipped applicator or throat swab.

The material obtained is immediately smeared on a glass slide, which is dropped into a fixative solution containing 90% alcohol or equal parts of alcohol and ether. The slide should be left in the fixative solution for at least one hour; then it may be taken out, dried, and delivered or mailed to the cytological laboratory, where the slides are stained and examined for any abnormal cells.

Correct technique in the taking of the smears, and knowledge of some of the pitfalls in obtaining adequate smears for study by the cytologist, are essential for the best results. For the correct interpretation of smears, clear cell nuclear detail is the most important factor, there must be adequate material for study, and the cells must be in a good state of preservation. Before digital pelvic examination, a dry speculum should be inserted into the vagina and a sample of the secretion taken from the posterior fornix by suction with a stout glass pipette or by a spatula, and then a scraping made from the squamo-columnar junction in the region of the external os. If there is much mucus present, this may be gently wiped away, care being taken not to rub the cervical epithelium too vigorously, as this may remove the very cells that one is trying to obtain for examination. The cervical smear generally will give the best results for the detection of carcinoma of the cervix, and the vaginal pool specimen gives information on the endocrine state and bacterial and parasitic vaginal infections, and is more reliable in the detection of endometrial carcinoma.

Lubricating jelly, if used on the speculum, may contaminate the smear and will often interfere with the proper staining of the cells. Vaginal pool smears taken during menstruation show blood and atypical endometrial cells, but give essentially no information about the cervix. Preexamination douches usually remove most of the diagnostic material from the vaginal pool. Smears

taken too soon after cauterization or during the time of frank non-cyclic bleeding can lead to the diagnosis of abnormal cells, no matter what the underlying lesion. The best smears taken at the optimal time will be unreadable if not fixed within a few seconds, especially during our hot summer months, as artefacts produced by air drying obscure the major features used in cytological diagnosis.

Carcinoma-in-Situ.

What is Carcinoma-in-Situ?

The histological appearance of carcinoma-in-situ or intraepithelial carcinoma was first described by Kermauner and Schottlander in 1912, who noticed a change on the surface of the cervix adjacent to an invasive carcinoma of the cervix and described it as a surface coating. Schiller (1927) described this change as preinvasive carcinoma, and today opinion is almost unanimous that this lesion is a precursor of invasive carcinoma. However, opinion is divided whether this lesion always progresses to invasive carcinoma given time. Proof of this is impossible to obtain, as most lesions are treated in some way, and with small lesions the biopsy itself may constitute a form of treatment. Much work has been done on this problem, notably by Galvin, Jones and Te Linde (1952), by Petersen (1956) and by Kottmeier (1955, 1957), and the evidence is strongly in favour of progression. How long this latent period will be before progression to invasive cancer in each individual case occurs, no one can say. Hertig gives some interesting figures, from material taken from the Free Hospital for Women, on the average age incidence of the various stages of carcinoma. The average age of 201 patients with carcinoma-in-situ was 38·0 years, and that of 131 patients with clinically unsuspected cervical cancer was 48·5 years. The average age of patients with invasive carcinoma, Stage I to Stage IV (excluding those unsuspected cases) was 51 years. These figures are substantiated by Anderson (1959) in Edinburgh, and by many others, and it is well known that although this latent period may be short, more often carcinoma-in-situ can exist for 10 to 15 years before invasive carcinoma develops. Obviously this is the time to detect this lesion, when it is almost 100% curable.

Clinical Features of Carcinoma-in-Situ.

There are no gross features of carcinoma-in-situ, although Paul Younge (McKay, 1959) claims that he can detect the lesion at times by the appearance of an erythematous patch (blush) in the epithelium of the portio. It is believed that the lesion commences at the squamo-columnar junction in the region of the external os, and then spreads up into the endocervix, or out onto the vaginal portion of the cervix. Carson and Gall (1954) stated that the site of origin was within the canal in their 44 specimens of early lesions which they subjected to serial sections, and that it extended to the portio vaginalis in only two instances. Gusberg and Moore (1953) found the majority of lesions in their series in the canal, at or near the squamo-columnar junction. Gusberg *et alii* (1953), in a study of the growth pattern of early invasive cancer of the cervix, state that the "breach invariably occurred on the canal side" and "frequently reached the parametrium before it appeared on the portio".

With extension of the growth out from the external os, it causes no obvious alteration in the gross appearance of the squamous epithelium. Since the majority of patients with carcinoma-in-situ have delivered at least one child, the cervix will frequently be grossly distorted by eversion, erosion or lacerations. There may be a congenital erosion, and when carcinoma-in-situ occurs in such a cervix, it is usually in the margin of the erosion.

Younge, Hertig and Armstrong (1949) reported the appearance of the cervix in 135 patients who were subsequently proved to have carcinoma-in-situ; 79% were reported as "an erosion", 9·5% as "suspicious of carcinoma" and 6·7% as "normal". Gusberg and Moore (1953) reported similar findings in 64 patients, of whom 60% were noted as having an erosion and 18% were normal. Foote and Stewart (1948) in a series of 24 patients reported 66% with erosions and 16% as normal.

Obviously the naked eye is not sufficient to detect these early lesions, and equally it is obvious that it is impracticable to take a biopsy of every erosion; this is where cytology is useful. Colposcopy, which was developed by Hinselmann and is practised extensively in Eropean countries, and which was recently reported by Coppleson (1959) in this country, will detect these early cases, but only when the lesion is present on the portio.

When to Take a Smear.

As carcinoma-in-situ cannot be detected by the naked eye, then in what cases should a cervical smear be taken? We may answer this by quoting what Younge of Boston and many others have recently said: "Carcinoma of the cervix is a preventable disease"; then all women should have a cervical smear examination at least once a year. This obviously is impracticable in this country, as the facilities and trained personnel for examination of these smears are not available. This question was discussed in an editorial in this Journal in May, 1958.

In America, several large surveys have been reported, in which every woman in a county has had a smear examined (Erickson, 1956; Nieburgs, 1957; Kimmelstiel, 1958). In Nieburgs' series, the smears from 6·6 out of 1000 women examined contained malignant cells. Kimmelstiel reported 5·6 out of 1000 as showing carcinoma proven by biopsy; of these lesions, 72% were carcinoma-in-situ and 28% were invasive cancer. Nieburgs showed that the peak incidence of carcinoma-in-situ lies between the ages of 30 and 50 years, and that of invasive cancer, between 51 and 60 years. In the age group 41 to 50 years, the pick-up rate for carcinoma-in-situ alone was 5·5 per thousand.

A different type of survey, in which all women attending a hospital or gynæcological out-patient department (that is, who have come with some complaint, not necessarily gynæcological) have a routine smear examination, shows a higher yield. Anderson (1959) from Edinburgh reports a discovery rate of just over 1%, or 10 in 1000, and of these lesions 73% were carcinoma-in-situ and 27% invasive carcinoma. A similar report comes from the Mayo clinic (Soule, 1959), where 90,257 initial screening smear examinations discovered 7·5 cases in 1000 subjects. No woman had had a previous smear examination at the clinic, and all had been given a clinical diagnosis of some benign lesion of the cervix or a normal cervix.

Before the use of cytology, these early lesions of the cervix were diagnosed mainly by routine examination of sections of the cervix removed at operation for some other indication. In other cases a biopsy was done because suspicious symptoms were reported, or because a suspicious lesion appeared on the cervix. If cytology is available, then it will indicate which cervices should be subjected to further investigation by biopsy, and which may be treated as benign. If cytology is used as a routine, especially in the age group in which the prevalence of carcinoma is highest, it will detect those small lesions or very early lesions which give no symptoms or signs.

Without cytology, when suspicious symptoms are reported and no visible lesion is present for biopsy, then some type of biopsy will probably be done, which may or may not be adequate. If, in addition, there is a suspected lesion, then a biopsy specimen from that lesion will be examined, and it may or may not be the malignant lesion. If the lesion is convincingly malignant, then cytology is superfluous, for the area to be subjected to biopsy is not in doubt. The following case illustrates these points.

Mrs. C., aged 29 years in November, 1957, complained of menorrhagia of six months' duration after the birth

of her sixth child, and of some recent irregular bleeding. The cervix was noted to be bulky, and a large erosion was present. A wedge-type biopsy of the cervix and curettage were carried out. These revealed chronic cervicitis with no evidence of malignancy, and chorionic villi present in the curettings. Three months later she returned for examination; the "erosion" was still present. A smear was taken and the cervix was cauterized. The smear contained malignant cells. Three weeks later the cervix "appeared healthy with a small area surrounding the external os which was Schiller positive". The smear examination was repeated, and again showed malignant cells. A cone biopsy then revealed carcinoma-in-situ. Total hysterectomy with conservation of the ovaries was not done for various reasons until six months later, and no residual carcinoma could be detected. She has remained well, and the smears contained no malignant cells 18 months later.

Confirmation of Unsuspected Positive Smear Findings.

The unsuspected positive smear finding comes from a cervix which is regarded as showing no obvious cancer when viewed with the naked eye. The cervix may be described by its appearance alone as healthy with intact epithelium, eroded, or affected with leukoplakia. If in addition there are associated symptoms such as post-coital or intermenstrual bleeding, our suspicions are aroused; but the appearance of the cervix remains the same. Confusion on this point often leads to the report that the cervix is suspicious in appearance because of its associated symptoms, which naturally leads to a higher rate of clinical suspicion. This is not a bad fault, as long as it does not lead to excessive hospitalization for biopsy procedures requiring an anæsthetic.

With any biopsy procedure there are several points to keep in mind. The lesions of carcinoma-in-situ may be very small, and without a visible lesion there is no guide as to where to take the biopsy specimen. Many of the old-type biopsy procedures, which were probably adequate in most cases when there was a visible lesion, are completely inadequate when one is dealing with these early lesions.

Many gynæcologists in America use four quadrant biopsy specimens taken from the region of the external os at 3, 6, 9 and 12 o'clock, often with the added help of Schiller's iodine test to give some indications where to take the biopsy specimen. This, combined with follow-up smear examinations, appears to be a satisfactory procedure, but can still miss the occasional small lesion. For this reason, cold-knife conization is now considered by most gynæcologists as necessary. A cone of tissue is removed from the cervix to include the squamo-columnar junction and any non-staining area of the cervix as indicated by Schiller's test and the cervical canal, almost to the internal os. This cone is subjected to multiple section examination, and the extent of the lesion is determined.

The recommendations of the American Cancer Society for the follow-up study are an excellent guide, but may be varied to suit the individual. (i) When a negative cytological report is received, and there are no suggestive symptoms or signs, a smear should be examined annually. (ii) When a positive cytological report is received, regardless of symptoms or signs, the following procedure should be carried out. (*a*) If there is an apparent lesion, then a biopsy is taken from that lesion. If this gives negative results, then a more extensive cold-knife cone biopsy with dilatation and curettage of the uterus should be done. If the biopsy finding is positive for carcinoma, then treatment should be given as indicated. If the biopsy shows no evidence of malignancy, then smear examinations should be carried out every three months. (*b*) If there is no apparent lesion, then a four-quadrant biopsy should be done. If the result of this is negative, then a cone biopsy with dilatation and curettage is necessary. If the biopsy reveals carcinoma, then treatment should be given as indicated. If the biopsy reveals no malignant disease, then smear examinations should be made every six months.

For the pathologist to make a diagnosis of carcinoma-in-situ, he must receive adequate material for the preparation of sections. It is well recognized that the malignant epithelium can be easily removed, even by minor trauma, especially when one is dealing with small lesions, and therefore it is imperative that the biopsy specimen be traumatized as little as possible. The biopsy must be done before dilatation and curettage. Often, on examination of cervical biopsy specimens, no epithelium is visible, and in dealing with this lesion, the study of the whole extent of the epithelium is most important.

From the clinician's point of view, once he has received from the pathologist the diagnosis of carcinoma-in-situ, this means only that there is carcinoma-in-situ present in that particular biopsy specimen; it does not exclude invasive carcinoma elsewhere in the cervix, unless the biopsy material was adequate. It is most important that there shall be close cooperation and consultation between the cytologist, the pathologist and the clinician in making the diagnosis of carcinoma-in-situ and in its subsequent treatment and follow-up control.

Treatment.

Once the diagnosis of carcinoma-in-situ of the cervix has been made, and invasive carcinoma has been excluded as far as possible by adequate histological examination, then the treatment of choice is total hysterectomy including a cuff of vagina. In the young woman the ovaries should be conserved.

This is not the end of treatment, because meticulous follow-up control must be carried out with examination of vaginal smears for a period of at least three years. If these findings remain negative, then the patient may be discharged as cured. The reason for this is that carcinoma-in-situ may spread extensively over the surface without invasion occurring, and has been reported as extending to the fundus of the uterus and to the fornices and vagina (Te Linde, 1957). The following case, before cytological investigation was used, illustrates this point.

Mrs. A., aged 51 years, had a vaginal repair with amputation of the cervix for prolapse in November, 1954. Examination of sections of the cervix revealed carcinoma-in-situ. She was readmitted to hospital and panhysterectomy was performed. No residual carcinoma could be demonstrated in the removed uterus. The patient was lost to follow-up investigation, but returned four years later with a slight blood-stained discharge of four days' duration, which was considered to be due to senile vaginitis. Six weeks later the appearance of the vagina had improved, and at that time a smear was examined; it contained malignant cells. Later biopsy confirmed that the lesion was a squamous cell carcinoma occurring at the vault.

The treatment of carcinoma-in-situ occurring in a young woman raises the question whether one can be conservative. Usually these patients are symptomless, the cervix appears normal and they have come for medical examination for some other reason.

Younge (1958), Te Linde (1957) and others have reported series of patients treated conservatively, but all stress that certain requirements must be fulfilled. First, the age and parity of the patient must make conservative therapy important. Second, the exact anatomical distribution of the lesion must be determined as far as possible; it should be confined to the region of the squamo-columnar junction or to the portio vaginalis, and should not involve the cervical canal. Third, examination of the excised cervix should show that the entire lesion was removed. Fourth, repeated examination, including smear and biopsy when necessary, must be continued, possibly through the life of the patient, or until hysterectomy is performed.

If examination of the removed specimen shows that not all of the lesion has been removed, or if follow-up examinations of smears or biopsies give positive results, then further more radical treatment is imperative.

The importance of this close follow-up investigation cannot be over-emphasized, as serious invasive carcinoma

may occur before definitive treatment can be instituted. The more widely cytology is used in this country, the more cases will be discovered early, which will bring their problems concerning management and method of treatment. The ideal would be for all patients with suspicious or positive smear or biopsy findings to be referred to a special clinic, where complete evaluation by a cytologist, a gynæcologist and a pathologist, interested in this work, would be made before definitive treatment is carried out, and where meticulous follow-up investigation could be continued.

Summary.

The present potential of exfoliative cytology in the early detection of carcinoma of the cervix is presented. The methods, commonly in use, of taking smears and the precautions necessary for their correct interpretation are mentioned.

Exfoliative cytology is a simple and inexpensive method available to all for the early detection of uterine cancer. It will indicate which lesions may be treated as benign and which need further investigation. The diagnosis of carcinoma must always be confirmed by histological examination of adequate biopsy material.

The detection of early cases, especially in young women, brings up many problems in management. A plea is made for the very careful assessment of each individual case and for close cooperation and consultation between the cytologist, pathologist and clinician before definitive treatment is carried out. The importance of meticulous follow-up control of these patients is emphasized.

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PSYCHOLOGICAL STRESSES OF CHILD-BEARING.[1]

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THE purpose of this paper is to discuss the normal and abnormal psychological stresses of childbearing. I shall deal with the more psychopathological aspects, though I hope I shall not lose sight of the normal. When a psychiatrist concentrates his mind on a subject of this nature and thinks back over relevant reading and cases in his practice, his thinking is liable to be unduly coloured by the psychopathological material with which he is normally preoccupied.

There is no shortage of clinical material in this field. Cases of so-called puerperal mental illness are common enough in any psychiatrist's out-patient, hospital or private practice; and in other cases of neurosis or psychosis we are often called upon to discuss attitudes and stresses associated with child-bearing, especially in women and in association with marriage problems. Fathers, actual or potential, of course, are not excluded.

There is, however, a shortage of literature in this field. I wonder whether this reflects, first, a relative dearth of research and therefore of knowledge concerning the psychological aspects of the important human function of child-bearing. This is suggested by a statement in an editorial in the *British Medical Journal* (1958):

> Detailed knowledge of the psychological changes and stresses of child-bearing is scanty, and prophylaxis and prognosis suffer accordingly.

I hope that in, say, twenty years' time, it will not be necessary to make such a statement as this.

A second reason for the shortage of accurate information may be that modern society tends to stress sexual rather than maternal rôles. National statesmen exhort us to have more children to maintain the population, and churchmen remind us of the responsibility of reproduction and parenthood; but western society as a whole is preoccupied with the enjoyment of sex rather than with the responsibility of child-bearing. Thus workers like Kinsey and Chesser make scant reference to reproduction in their large volumes on the varied expressions of our sexual drive. We are more concerned about contraception than conception, and our rationalizations become more convincing when world statesmen and sociologists warn us of the dangers of over-population and food shortages. Perhaps all this is unconsciously reflected in psychological

[1] Read at a meeting of the Special Group of Neurology and Psychiatry of the New South Wales Branch of the British Medical Association on May 5, 1960.

and psychiatric thought and research. It is also of interest that the women who do the child-bearing and like it seldom have the time to write about it. Most verbalization on this subject comes from men, or from women who have rejected at least part of their biological rôle in busy professional lives.

Having remarked on the paucity of literature on this subject, I must confess that I have had time to look at only a fraction of it. Thus my perspective is somewhat limited and probably distorted; but I hope this will arouse your hostility and stimulate further reading and research about the psychology of child-bearing, among general practitioners, obstetricians, psychiatrists and others. It is encouraging, by the way, to read such helpful contributions to the subject, by Professor Mayes and Professor Trethowan in the former's "Textbook of Obstetrics" (1959). Here the chapter on the management of normal pregnancy commences with a section on the psychology of the pregnant woman, and it is suggested that the mental association of child-birth with hospitals and doctors, which may encourage the notion of pregnancy as a sickness, and the lurid gossip of some well-meaning relatives and friends, may be counteracted by a positive, enduring, reassuring doctor-patient relationship, which stresses the normality of child-bearing and reduces fear and pain with understanding, faith, relaxation and training. The general atmosphere of calm and confidence should be reinforced by all who come into professional contact with the pregnant woman, including nurses and social workers and the hospital secretarial staff. Needless to say, this ideal is not easy to attain.

The use of hypnosis in labour has received some attention recently (Perchard, 1955). I have had no experience of this use of hypnosis. It would seem to have a useful place in a few situations—for instance, when the obstetrician has the time and training in its use. The thought occurs to me that, although education is important, suggestion must play a large part in the methods of Grantly Dick Read, Lamage and others, and I wonder where suggestion ends and hypnosis begins (editorial, 1960).

Child-bearing arises out of sexual, reproductive and maternal drives. As Edward Griffith (1957) reminds us:

> The sexual impulse has three complementary and mutually inclusive functions: the transference of sex energy into other creative channels, mating, and reproduction. The first is the channel through which sexual energy can be released in activities of social value. . . . The second is one of the chief ways in which the emotional needs of man and woman can be fulfilled and is the more personal and intimate. The third, by creating children, is the fulfilment of the individual's biological and social needs and the way in which he perpetuates himself. All three must find expression both separately and together in the marriage relationship. There are times when sexual activity must be curtailed or forgone; there are times when the achievement of an emotional rhythm and orgasm is essential; and there are times when children must be brought into the world. Each function has its own proper uses and provides it own rewards.

We see, then, that sexual intercourse has both relational and reproductive aspects, and the former may exist without the latter; that is, there are times when intercourse may be primarily an expression of love and desire. At other times, its primary conscious purpose may be reproduction, the relational aspect being minimal or even absent. Even frigid women may reduce contraceptive efficiency purposely without telling their husbands in order to conceive. It is believed that when both relational and reproductive aspects are maximal at the same time, conception is more likely. I mention these things because a woman's attitude to child-bearing, though primary and basic *per se*, is closely associated with and greatly influenced by her attitudes to sex and to her husband. A happy marriage is more likely to be associated with positive attitudes to child-bearing. Some related observations by Newton (1955) are of great interest. She finds that women who fear child-birth are less likely to have good sexual adjustment. Uninhibited, undrugged child-birth resembles sexual excitement and orgasm with regard to respiration, facial expression, uterine contractions, contractions of the abdominal muscles and position of the body. In both, the woman becomes uninhibited emotionally as orgasm or expulsion of the baby approaches, and there is reduction of perception of the environment and sometimes partial amnesia. Afterwards there is a sudden return of sensory acuity, with relaxation and a feeling of well-being and even of ecstasy. It is tempting to postulate that emotional and sexual maturity, and capacity for orgasm, are correlated with capacity for normal parturition.

Newton also points out that breast feeding, as well as sexual excitement, is associated with uterine contractions, and that when they are absent, the mother is likely to have an inadequate milk supply. The breast is a sensitive erotic area that gets extensive stimulation during breast feeding.

Child-bearing is woman's unique rôle and one of her deepest emotional experiences. Her physical and psychological development, from the very beginning, is directed toward the goal of motherhood. Van de Velde (1941, 1956) stresses the power of the maternal drive, and insists that the sexual impulse is fundamentally an impulse to reproduce, even though in recent times the two impulses have become increasingly distinct because of the modern emphasis on sex rather than on reproduction. Griffith (1957), following Freud and Havelock Ellis, differs from this view, and feels that the sexual drive has nothing to do with reproduction, except that it may, under appropriate circumstances, lead to it. On the other hand, the maternal drive, which is so strong in woman, may be aroused in her whilst the sexual drive remains relatively dormant.

Whatever view we take, most of us will agree with Van de Velde's aphorism: "Work is to the man what maternity is to the woman." The little girl cares for her dolls and, under favourable circumstances, loves to nurse her baby sister or brother. One of my woman patients, in the course of psychotherapy, traced her fear of harming her children and her hostility to her husband partly to the fact that her father used to punish her by depriving her of her favourite dolls. In the teens the maternal drive recedes somewhat because of the primacy of sexual drives in finding a mate; but once her man is captured, the young woman's impulse to motherhood reasserts itself. Its power can be witnessed in the anguish of those who find themselves temporarily or permanently sterile, and of those who cannot find a mate. I had a pre-menopausal patient recently whose husband had refused to have more than one child in the twenty years since they had married. This was a powerful ætiological factor in her attack of acute mania with paranoid colouring.

William McDougall (1947), in picturesque phrase, states that the parental instinct is "Nature's brightest and most beautiful invention". He goes so far as to suggest that this instinct is "the Mother of both Intellect and Morality"; of intellect, because intelligence is needed to find ways of nourishing and protecting the human young, who are dependent on the parents for so long; of morality, because the parental impulse is altruistic and unselfish. Perhaps it is time modern psychologists rediscovered some of the old truths in McDougall's flowery speculations and observations.

Van de Velde (1956) describes an interesting group of women who, though feminine and sexually mature and adequate, possess diminished maternal drive. However, if they do become pregnant, they regard the birth of the child as a wrong done to the child itself, and compensate by caring for it conscientiously rather than maternally.

Factors Influencing the Attitude to Child-Bearing.

There are many possible factors which can influence a woman's attitudes to child-bearing.

Social Factors.

Financial stringency is not such a major factor in these prosperous days as it was a decade or so ago. More

commonly we find inadequate housing as a factor which increases the stress of child-bearing. This may be accentuated if interfering in-laws share the same house, so that the young mother lacks the privacy she needs to develop her own confidence and independence in rearing her children. The presence of several previously borne children and the difficulty of obtaining domestic assistance may be further stresses.

An Inadequate or Absent Husband.

The maternal drive, to function at its highest level, needs the emotional support of a secure relationship with a reasonably mature husband, who also wants to become a father. The stress of child-bearing in the wife is greatly increased if she cannot depend on her husband at all times, and particularly during pregnancy, labour and the puerperium; if he is neglectful or alcoholic; if he consciously or subconsciously regards the baby as a rival for his wife's affection; if he is emotionally immature and inadequate; or if he is absent for one reason or another. This kind of situation is quite common, and I believe that it is insufficiently recognized as an ætiological factor in puerperal mental illness, in cases of which the husband should always be carefully interviewed in a search for obvious or subtle inadequacies, as well as for difficulties in the marital relationship. A woman's attitude to her pregnancy is coloured by her attitudes to her husband, who is the cause of the pregnancy. On the other hand, the expectant father needs to be taken into the doctor's confidence in all confinements almost as much as his wife. He needs to understand the whole situation so that he can be of maximum assistance and support to his wife. Kenneth Walker (1957) has an excellent chapter on the expectant father in his recent book "Love, Marriage and the Family", which includes an entertaining discussion of the *couvade*.

The Attitudes of the Patient's Mother.

The attitudes of the patient's own mother are of deep and basic importance. Mothers with negative attitudes to child-bearing tend to produce daughters with the same attitudes. Here we encounter the all-too-familiar patterns of deprivation of maternal affection, maternal rejection and compensatory over-protection, which tend to produce in the daughters distorted mother-identification, hostility to mothers and motherhood, and inadequacy in emotional and sexual relationships. Moreover, daughters who see their parents unhappily married tend to fear or reject marriage and parenthood.

For example, a married woman, aged 35 years, with three children, who comes to me for psychotherapy, is now conscious of what she was previously unaware of—namely, that she rejected the whole female role. This she expressed in numerous ways—retreat into office work, the wearing of slacks, subtle domination of her husband, and rejection of domesticity and her children. She now expresses these things in writing poetry and in free painting, though she still finds it difficult to adjust herself to her true biological role. She was grossly rejected by both parents, and was the victim of incestuous advances by her alcoholic father. I will pass round one of her oil paintings which she calls "The Resurrection", and which portrays the crucifixion of womanhood. Here is one of her poems:

Conclusion.

Not all those who suckle
Can love the very young;
That love must needs be planted
Back in far off time
With seed
To grow
And grow
In company
Over the years
In the rose garden.
But now that door is closed
And one must needs distant fields
Ever to explore
In restless search.

Fleming (1960) performed Rorschach tests on a number of women in partial remission from puerperal psychoses. In most cases he found a "cloud", "smoke" or "island" response to card seven, which he regards as the "mother" card. He considers that this indicates that the inner fault lies in the woman's relationship with her mother. The response means that free anxiety ("clouds", "smoke") obscures the mother symbol. This can occur when there is a history either of maternal deprivation or of "s-mothering". Often the story is one of exhausting conflict with the patient's mother and great ambivalence about independence from her control.

A mother's silence, or voiced fears, about child-bearing, may produce deep fears of child-birth in her daughter, which may be partially or wholly repressed. Ernest Jones (1948) published a helpful though rather speculative paper on early childhood notions of child-birth. In it he stresses the deepest fear in the female heart—namely, that of being torn open and damaged internally. In the unconscious this fear may become associated with menstruation, rupture of the hymen at the first coitus and child-birth. He postulates that this and other fears, hatreds and resentments in the unconscious may be activated during labour, and may either inhibit the neuromuscular mechanisms concerned with expulsion, or exaggerate them in violent and ill-timed fashion.

Another unhealthy mother-daughter relationship is that of undue and prolonged dependence. The daughter may thus feel inadequate to cope with the stresses of child-bearing. Here is another fruitful cause of unconscious rejection of her unborn child, and such rejection may express itself in fears that she cannot survive labour or that she will produce a dead or deformed child.

Unwanted Pregnancy.

The pregnancy is unwanted, because it is either illegitimate or unplanned. This attitude, too, may result in feelings of rejection toward the unborn child, which may be conscious or repressed.

Constitution.

Professor Trethowan (1959) reminds us that there is often an association between a shy, immature, withdrawn personality, and a juvenile physique, dysmenorrhœa, a narrow pelvis, small breasts, an infantile uterus, frigidity and diminished capacity for adequate emotional relationships with husband or child.

Personality Type.

The hysteroid woman may unconsciously find in her pregnancy an excuse for clinging dependence and a theatrical display of emotion if her need for dependence is thwarted. She also tends to regress more than the average woman during labour.

The obsessional woman is often a model patient at first, following strictly and conscientiously all the routines and rules; but her rigidity prevents her from adapting herself smoothly to any variation from the norm, and her tendency to doubt, and her compulsion to be sure of everything, demand more than average explanation and reassurance from her doctor.

The anxious woman is prone to all kinds of fears about child-birth, and lacks confidence in her ability to cope with a new baby.

Both the obsessional and the anxious woman tend to be tense and afraid during labour, and hence are predisposed to uterine inefficiency.

Other personality types react in their own characteristic ways; but in this context I will mention only the irresponsible psychopath, whose egocentric and unruly emotions are a poor substitute for true mother love, and who tends to neglect the hygiene of pregnancy and the puerperium.

A Predisposition to Neurosis.

As Professor Trethowan (1959) has stated, pregnancy often proceeds with surprising smoothness in the emotionally immature or even the frankly neurotic. He suggests the following explanation:

> This may be due to an increased feeling of contentment which pregnancy often brings, which may in

itself have a physical basis. It may also be a result of withdrawal of interest from disturbing external affairs, or of the added attention paid by husband, friends or relatives which tends to feed the expectant mother's self-esteem. During labour, however, the influence of underlying neurotic conflicts may once again receive physical expression.

Neurotic factors tend to reassert themselves, then, during labour and the puerperium, when an adjustment must be made to the responsibilities of parenthood, and the relative protection of pregnancy is over.

A Predisposition to Psychosis.

A predisposition to psychosis may exist because of inheritance or previous psychotic illness, or because the woman has a cycloid or schizoid temperament. We are faced at this point with a brief consideration of the ætiology of the psychoses of child-bearing. These, of course, whether they occur during pregnancy or the puerperium, are treated in much the same way as if they occurred at any other time, and the response, though it may take longer than in non-puerperal psychoses, is usually good.

The ætiology of these psychoses has been in dispute for many years, and no conclusion can yet be reached. One view is that child-bearing is a significant and specific factor in causation, either because of physical factors such as infection, toxæmia, hæmorrhage or hormonal disturbances, or because of psychological factors such as recent stress, unwanted pregnancy, an unhappy marriage or unconscious rejection of motherhood.

Another view is that child-bearing is not in itself a true ætiological factor, but merely a precipitating stress in a background of predisposition to psychosis, the psychosis itself being indistinguishable from other psychoses not associated with child-bearing.

In an attempt to clarify the position, Tetlow (1955) in England carried out a statistical investigation of 67 consecutive hospital cases of psychosis complicating childbirth. He found a correlation between such psychoses and a family or personal history of psychosis, neurosis or abnormal personality type. Thus the existence of predisposing factors seems clear, and these factors are similar to those found in psychoses not associated with child-bearing. He found no statistical association with the occurrence of obstetrical complications; nor is a psychosis more likely to occur in relation to a first pregnancy with its greater incidence of complications. It is also of great interest that he found over a period of three years in the same hospital six childless women being treated for a depressive psychosis following the adoption of an infant. He states: "It is tempting therefore to think that it is the psychological impact of the child which is the disturbing factor, and not the physical act of birth." He puts forward a third hypothesis concerning the ætiology of the psychoses associated with child-bearing—namely, "that obstetrical complications are not a factor, but that a personality predisposition to mental disorder exists, this defect of personality relating specifically to the sexual and reproductive life of the patient". For example, he found that 10% of women in his series were single, whereas only 2% of his psychotic controls were single. Of the series, 60% suffered from an affective psychosis, and in every one of these there was an abnormal emotional relationship with the child, expressing itself as a perverted hatred, indifference, or phobia that the child would be injured or killed, or even a denial that the child was theirs. My own experience would tend to confirm that of Tetlow, though in some cases I have thought that the feelings or fears in relation to the child were activated by the depression rather than vice versa, and that they had their roots in repressed emotional traumas in the woman's own childhood, rather than in her conscious attitudes to her baby.

Vomiting of Pregnancy.

Having covered in very sketchy fashion some of the factors involved in the psychological stresses of child-bearing, I should like to mention one further point of interest, which concerns excessive vomiting of pregnancy. The orthodox view is that, as far as psychological factors are concerned, the vomiting represents a symbolic attempt to get rid of something which is not wanted—namely, the baby. Newton (1955), however, points out that if this view was a complete explanation, one would expect to find a higher incidence of hyperemesis in single women. In fact, the incidence is no higher. She found that the experience of frequent undesired sexual intercourse, and undue dependence on the mother, were commoner accompaniments, but suggests no explanation of this. I wonder whether excessive nausea and vomiting in pregnancy may sometimes represent a desire to be rid of the husband as well as his unborn child.

Newton also found that it was the women who disliked being pregnant who were most likely to terminate their pregnancies with easy childbirth. Dislike of being pregnant, of course, is not necessarily associated with rejection of the baby.

Summary.

1. Much remains to be learned about the normal and abnormal psychology of childbearing.

2. A good relationship of the expectant mother with her doctor can do much to reduce fear and pain.

3. The maternal drive is powerful and important, and childbearing is woman's unique rôle, and one of her deepest emotional experiences.

4. A woman's attitudes to child-bearing are influenced by social factors, by the quality of the husband-wife relationship, by the attitudes of her own mother, by an unwanted pregnancy, by constitution, by personality type, or by a predisposition to neurosis or psychosis.

5. In the ætiology of psychoses associated with child-bearing, obstetrical complications are probably not a factor; but there is a personality predisposition to mental disorder, this defect of personality relating specifically to the sexual and reproductive life of the patient.

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A SIMPLE CAPILLARY-BLOOD ONE-STAGE PROTHROMBIN-TIME TEST.

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ON the basis of the original work by Quick (1935), many tests have been devised in which the prothrombin time is used as an index of control in the treatment of thrombo-embolic vascular disease by coumarin-type drugs. The test is also useful as a liver-function test,

where it serves as an indication of vitamin K conversion and incorporation into the prothrombin complex. Although the one-stage prothrombin test is not very specific, it has stood the test of time as a simple and practical procedure; yet from the patient's point of view, it is time-consuming and inconvenient, because with few exceptions the patient has to attend the laboratory, where the test is carried out almost immediately after the collection of blood. In practice, this type of procedure means that patients on coumarin drugs have to have repeated venipunctures, which are unpleasant and at times frustrating to attendants faced with "difficult" veins and irritable subjects. In infants and young children repeated venipunctures have never been a practical proposition, so that in cases in which thrombo-embolic disorders have to be treated, preference is often given to drugs with heparin-like action, the control of treatment being carried out on capillary blood.

Several methods utilizing capillary blood for the performance of the one-stage prothrombin-time test have been devised (Reich, 1958; Dyggve and Lund, 1954; MacMillan, Brown and Watt, 1959; Schoshkes and Grunwald, 1959; Manchester and Rabkin, 1954; Rosling and Schoenheyder, 1955; Lewis, Ferguson, Spaugel, Fresh and Zucher, 1957); but they are as a rule tedious, difficult to perform and time-consuming and the results are not highly reproducible, particularly in the therapeutic range.

Recently, a reliable, apparently sensitive, yet relatively elaborate test using venous blood was devised by Owren (1959). Unfortunately, the variant of this test on capillary blood requires the patient's attendance in the laboratory, which limits the usefulness of the procedure.

The object of this paper is to describe a simple and reliable modification of the one-stage prothrombin time test using capillary blood; the blood can be collected at the bedside or in the patient's home, as it is possible to perform the test some hours afterwards.

Technical Method.

The following reagents and apparatus are required: a water bath at 37° C.; clotting tubes, 10 by 75 mm., siliconed and non-siliconed; opsonic pipettes, graduated to 0·2 ml.; hæmoglobin pipettes and hæmoglobin-diluting fluid.

The brain thromboplastin used is acetone-extracted, dehydrated human or rabbit brain, prepared according to the method of Quick (1940), and ampouled *in vacuo* in quantities of 0·1 gramme. Prior to use, 0·1 gramme of brain thromboplastin is diluted in 3 ml. of physiological saline and incubated in the water bath at 37° C. for approximately 10 minutes.

Other materials required are: 0·2% trisodium citrate in *Aqua Destillata*, freshly made from 3·8% or 5% sterile citrate solution; a stop watch; a sharp puncture needle or cutting blade; M/40 calcium chloride stock solution in *Aqua Destillata*.

Technique.

The test is performed as follows.

The skin is cleaned with ether, and a puncture is made on the tip of the finger or heel. The collection should commence with the first drop of blood that appears after the puncture; 0·1 ml. of blood is allowed to flow into a 0·2 ml. non-siliconed opsonic pipette, and delivered immediately, with several rinses, into a siliconed glass or plastic clotting tube containing 0·4 ml. of 0·2% citrate solution. This is sufficient for two determinations of the prothrombin time. An estimation of the hæmoglobin value is done at the same time in the usual way.

The hæmolysed citrate-blood mixture is allowed to stand at room temperature for a minimum of five minutes and a maximum of five hours.

To perform the test, 0·2 ml. of the blood-citrate hæmolysate is transferred into a non-siliconed clotting tube in the water bath at 37° C., and 0·1 ml. of the thromboplastin suspension is added. Next, 0·1 ml. of M/40 calcium chloride solution is blown forcibly into the mixture, and the stop watch is started simultaneously. The tube is lightly shaken in the water bath, then tilted gently to and fro, a watch being kept for the incipient fibrin web or the jelly-like clot appearance, either of which is taken as the end point in this test. The mean of two determinations is taken as the "prothrombin" time.

A similar test is performed on a normal control, including the hæmoglobin estimation.

If the patient is receiving drug therapy of coumarin type and there is no reason to suspect blood loss, hæmoglobin estimations may be done at monthly or two-monthly intervals.

Interpretation.

The normal control's prothrombin time is checked on the graph (Figure I) against his hæmoglobin value.

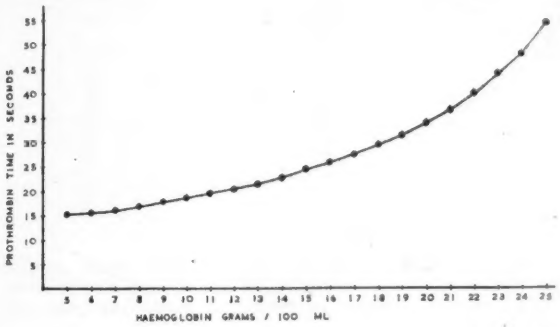

FIGURE I.

It should fall within the normal curve scatter, which is three seconds on either side of the curve for hæmoglobin values up to 15 grammes per 100 ml., and five seconds for higher values. This is to ensure that all the ragents used and the test performance are satisfactory. No reliance can be placed on the interpretation of the test if the normal control's prothrombin time falls outside the curve scatter.

The patient's prothrombin time is then checked against his hæmoglobin value on the same graph (Figure I).

If a prothrombin index is to be reported on, it is calculated by using the formula $\frac{PT(n)}{PT(p)} \times 100$, where $PT(n)$ is the expected normal prothrombin time for the patient's hæmoglobin value on the curve, and $PT(p)$ is the actual patient's prothrombin time as obtained in the test.

Precautions, Sources of Error and Limitations.

Collection of blood from a warm finger or heel is mandatory to ensure easy, steady blood flow; blood should be collected without air bubbles and with the least possible delay. It should be delivered immediately after collection into the citrate solution.

With very high hæmoglobin values (19 grammes per 100 ml. or above) the test should be performed at least in triplicate, as the end point is not sharp to the inexperienced.

The brain thromboplastin is unsatisfactory for the test if the conventional plasma prothrombin time of the normal control is longer than 15 seconds, or outside the curve scatter (Figure I) for the given hæmoglobin value on capillary hæmolysed blood.

Silicone-coated glass clotting tubes are preferable for storage of the hæmolysate-citrate mixture. This is not essential, but estimation of prothrombin time with either venous or capillary blood stored in glass will give shorter clotting times (*vide infra*).

Results.

All tests were performed in duplicate and the mean estimate was recorded. The difference in the two estimates did not exceed two seconds.

Hæmolysates from both normal subject and patient were made after the addition of citrated plasma to different amounts of packed cells, and the relationship of prothrombin complex activity of a normal individual and that of a patient receiving a coumarin type of drug therapy was evaluated at different hæmoglobin values (Table I).

TABLE I.

Hæmoglobin Value. (Grammes per 100 Ml.)	Prothrombin Time. (Seconds.)		Index.
	Normal Control.	Patient.	
10	18	74	26
11	19	75	26
12	20	77	24
13	21	79	26
14	22	82	26
15	23	85	27
16	24	87	27
17	26	93	27
18	28	98	28
19	32	105	30

The correlation between the capillary blood method of estimating the prothrombin time and the conventional venous method is shown in Figure II (see also Figure III).

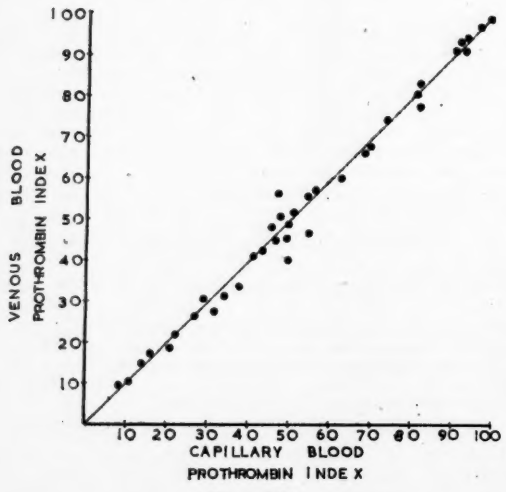

FIGURE II.

The prothrombin times were tested on the same sample of capillary blood at different time intervals in order to assess the effect of storage. Figure III shows that no significant change in the hæmolysate stored in silicone-coated glassware at room temperature occurred for four or five hours after collection.

Discussion.

It has been found (O'Brien, 1959) that intact red blood cells are inactive in blood coagulation tests, but when they are hæmolysed, an active fraction from the red-cell membrane gives lipoid-like platelet activity. In the present study it has become apparent that with increasing hæmoglobin values the prothrombin times under test conditions grow progressively longer. This may possibly be explained by observations made by Serafini and Centurelli (1959), who have found that concentrated hæmolysates have an inhibitory effect on thromboplastin, thrombin generation and thrombin-fibrinogen reaction.

As the prothrombin time reflects the combined activity of several clotting factors, it is worth while considering that reduction of these components, either singly or in combination, may result in a prolonged prothrombin time. It appears that factor V must be depressed to less than 70% of normal (Alexander and Goldstein, 1952), factor VII below 50% of normal (Alexander,

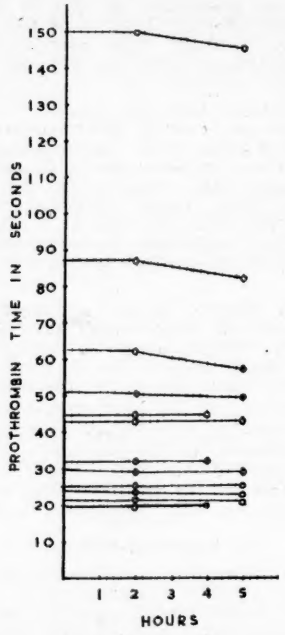

FIGURE III.

1955) and fibrinogen to less than 120 mg. per 100 ml. (Alexander, de Vries and Goldstein, 1949) to give prolonged prothrombin times. The Stewart-Power factor may also be depressed, giving as a rule only very slight prolongations of the prothrombin time. Factor IX is not assessed in the one-stage prothrombin tests, although it is involved in the "intrinsic" thromboplastin formation (Owren, 1959).

The interpretation of prothrombin times has always been dubious and a matter of much argument. The conventional usage of the prothrombin index — namely, the ratio of the prothrombin time of a normal individual and that of the patient expressed as percentage — may convey an erroneous impression that it is the actual measure of the prothrombin complex activity or its concentration in blood. This is certainly not the case; the "prothrombin" complex consists of several factors, all of which are involved, yet at different rates and actual concentration in the end point of the test — that is, clot formation. The function of these factors, $y = f(x_1 x_2 x_3 \ldots)$ is not and cannot be represented in a linear fashion (Lund, Geill, Sondergaard and Dam, 1955). One may observe this fact when studying the hyperbolic curve of prothrombin activity. Therefore, conversion of prothrombin times using index values to estimate the relative "prothrombin" complex activity (or concentration) is at its best an approximation only, even when both control's and patient's "prothrombin" times are on similar sections of the curve. It is obvious that the prothrombin activity, in what is usually con-

sidered the therapeutic index range, actually represents only a fraction of its index figure value. Only with these reservations can the prothrombin index be used as a means of control of therapy with coumarin type of drugs or as a liver-function test.

A justifiable criticism has been made against the one-stage prothrombin test by stating that it would determine only certain factors of the "prothrombin" complex, such as prothrombin factors V, VII and Stewart-Prower, but not others (for example, factor IX) that are depressed during anticoagulant therapy (Owren, 1959). This may well be so; but it has also been stated that during prolonged treatment with coumarin-like drugs, all factors taking part in the "prothrombin" complex are depressed at approximately parallel levels (Owren, 1959; Mathews and Walker, 1959); hence a measurement of one — for example, factor VII — should usually indirectly express levels of other factors.

The present test has been devised to give clotting times between 50 and 100 seconds in the usual therapeutic range. This increases the sensitivity of the test when compared with the conventional way of testing samples of venous blood, in which a difference of several seconds in the control's clotting time may reflect a considerable difference when expressed as an index to that of a patient on coumarin-type drugs.

It has been shown by Waaler (1959) that spontaneous activation of coagulation when blood is brought into contact with glass may give short clotting times, and thus lead to errors in the calculation of prothrombin indices. As is shown in Figure III, the present test is free from these objections.

In the conventional one-stage prothrombin test, the plasma dilution with citrate will vary with different hæmatocrit values. In the present modification, the final concentration of citrate is the same, and adjustments are made for different hæmatocrits approximating them to hæmoglobin values. Thus, using whole blood may be an added advantage over using plasma for determination of prothrombin time.

Summary.

A simple one-stage prothrombin time test using capillary blood is described. The present modification makes the test more sensitive and stable on blood stored at room temperature for up to five hours. The main use of the test is in control of treatment by coumarin-type drugs of thrombo-embolic vascular disease; but it may, as the conventional test, be employed for evaluating the hæmorrhagic tendency of the new-born or used as a liver-function test.

Some relevant points concerning interpretation of values and limitations of the test have been discussed.

Acknowledgements.

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INTESTINAL OBSTRUCTION AND THE USE OF UNABSORBABLE SUTURES AND LIGATURES.

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ONE of the surprising things about abdominal surgery is the frequency with which adhesions spontaneously resolve. When an abdomen is opened a second or third time, some period after an episode of severe peritonitis, all stages of this spontaneous resolution are seen. It is apparent that the natural history of fibrinous adhesions is that most of the fibrin is absorbed before organization can occur, and that most of the adhesions which do not become organized are gradually stretched and thinned and eventually rupture and disappear. Some adhesions persist, particularly between the small bowel and the abdominal wall, between loops of small bowel themselves, and between the small bowel and the female pelvic organs. They persist as cord-like bands or as short, broad-based fibrous adhesions. Welch (1958) lists the possible causes of such adhesions as infection at the operation site, rough handling of the tissues, wiping the intestine with gauze, the use of large ligatures causing necrosis of tissues, failing to peritonealize raw surfaces and the insertion of foreign bodies.

In essence, adhesions seem to persist when there has been destruction of adjacent peritoneal surfaces or when a low-grade inflammatory process continues. The use of unabsorbable sutures inside the peritoneal cavity is not usually quoted as one of the causes of the persistence of post-operative bands, but there is no doubt that it is, and possibly a more important cause than has hitherto been realized. Snodgrass (1939) quoted two cases in which a length of silk became loose in the peritoneal cavity and formed a loop, strangling a coil of small intestine; but in both cases it was the silk itself and not a band which was responsible for the obstruction. Post-operative small-bowel obstruction due to strangulation by/or kinking over a long, thin band in the absence of other local adhesions is not particularly common. Among many cases of small-bowel obstruction in my own practice, there have been only five or six due to a single band. Unabsorbable suture material has been found within the bands in two recent

cases. When a band is found, on most occasions the surgeon is rewarded with complete relief of the obstruction by simply dividing the band with one snip of the scissors. It is not usual to remove the band completely, detaching it from its origin and insertion. It is possible that thread might have been found within the bands in one or more of the earlier cases, unrecognized because the bands were not removed and examined minutely.

Reports of Cases.

CASE I.—Mrs. A., aged 25 years, was admitted to the Royal Melbourne Hospital on November 29, 1956, suffering from an acute intestinal obstruction for the second time in six months. Earlier she had had an appendicectomy and after that a salpingectomy for a ruptured ectopic pregnancy. On this second occasion, loops of small bowel were found adherent to the scar of the previous right paramedian incision, but the obstruction was due to a long, thin band twisted around and strangulating the base of a small loop of the ileum. This band was approximately 4 cm. long, attached at one end to the ileum just proximal to the obstructed loop and to the mesentery of the same loop at the other. It was removed and found to contain a straight length of thread 2 cm. long. This was dissected out; one end was frayed and the other sharply cut—obviously a piece of waste thread cut off after the tying of a ligature and allowed to drop inside the peritoneal cavity. The only other abnormality was a second long band found running from the side of a loop of jejunum to the posterior abdominal wall. It was attached to a small, yellowish nodule 0·5 cm. in diameter on the jejunum, and this nodule enclosed a thread knot. No other adhesions were found.

CASE II.—Mrs. B., aged 48 years, was admitted to the Royal Melbourne Hospital on July 23, 1956, eight months after an appendicectomy for perforated acute appendicitis with acute small-bowel obstruction of three days' duration. The peritoneum contained blood-stained free fluid. There was a "closed loop" obstruction of a coil of lower ileum, which was caught under a thin, taut fibrous band running from the right pelvic brim to the antemesenteric border of a loop of ileum just above the obstruction. The band was divided, and dissection of its attachment to the ileum revealed a small thread knot (Figure I). No other adhesions were found.

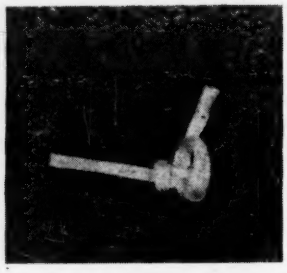

FIGURE I.

An enlarged photograph of the single-thread knot which caused the second patient to have a second operation. The smooth outline of the knot and its resemblance to catgut are due to the impregnation of the thread with tissue fluids.

Conclusions.

When one considers the many thousands of abdominal operations in which thread ligatures and sutures have been used successfully without subsequent small-bowel obstruction, it is obvious that no direct conclusions can be drawn from these two cases. However, the clear findings in these cases do indicate that unabsorbable suture material may be a factor leading to the formation of bands, or at least to the persistence of bands for a long time. Given time, even these tough cords might have stretched and ruptured spontaneously; but the fact remains that they did cause small-bowel obstruction, and did cause the patient to have another severe illness, anæsthetic and operation.

In the future, any similar post-operative bands found should be dissected out and closely examined, together with their attachments, to see whether unabsorbable sutures and ligatures are an important cause of post-operative band formation, or whether the consecutive occurrence of the reported cases was mere coincidence. If it is not coincidence, then it may be that we can save one or two patients from a post-operative small-bowel obstruction by using catgut rather than thread whenever possible, particularly in infected or potentially infected abdomens. This applies especially to mesenteric ligatures and purse-string sutures used during appendicectomy for acute appendicitis.

Summary.

1. The well-known causes of post-operative intraperitoneal adhesions are listed briefly.

2. Two cases of small-bowel obstruction due to a single band are described, and the persistence of the bands is related to the use of unabsorbable suture material at a previous operation.

3. It is suggested that catgut instead of thread be used whenever possible in operations inside an infected or potentially infected abdomen.

Acknowledgement.

I wish to thank Mr. H. H. Eddey for permission to publish these cases.

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MICROCORNEAL CONTACT LENSES.

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Sydney.

UNTIL the last few years, the poor degree of tolerance to contact lenses has been a deterrent to their prescription. The original Haptic type contact lens was fitted on the sclera, and the space between the cornea and the lens was filled with fluid. There were frequent problems associated with veiling, œdema of the cornea, and air bubbles getting in the way, and also the degree of tolerance was poor, about four to six hours being the maximum wearing time.

The next modification was the corneal lens of Touhy, which had no scleral band. This resulted in an increase of tolerance to eight to ten hours in about 40% of cases. This type of lens was about 11 to 13 mm. in diameter.

In the last few years a new type of lens has been developed, the microcorneal lens. This lens takes cognizance of the fact that the central portion of the cornea is more curved than the peripheral portion, which is flatter. These lenses have a much greater degree of tolerance, and 80% of patients get all-day wear after four to six weeks of use. This wearing period should be so comfortable that the patient is unaware that he is wearing the lenses. I have some patients who on occasions have forgotten to take the lenses out at night; however, it is not recommended that patients leave their lenses in at night. The microcorneal lenses stay in place by means of surface tension, owing to the thin film of fluid between the cornea and the lens. The insertion and removal of the lenses are not difficult—in fact, the process is much simpler than with the older type of contact lens. Also, with these new lenses a prescription can be written which can be reduplicated, without its being necessary for the patient to have another fitting. This was not possible with the older type of contact lens.

The Indications for Prescribing Microcorneal Lenses.

Conical Cornea.

This is the most important indication for microcorneal lenses. With ordinary glasses, the vision of these patients

is usually much reduced and distorted. With corneal lenses their visual acuity will improve to 6/6, and the distortion will be eliminated. These people have an irregular astigmatism of the cornea, due to the formation of a cone-like bulge, on account of a weakness and thinness of the centre of the cornea. This usually appears at about puberty, more often in girls than in boys. All patients with conical corneas should wear corneal lenses, as they not only improve the vision, but also act as a support to the cornea and tend to stop any progression of the keratoconus.

Aphakia and Anisometropia.

In uniocular aphakia after a cataract extraction, it is impossible to correct the condition with ordinary spectacle lenses when the other eye has normal vision. This is due to the fact that the image of the aphakic eye is approximately three times larger than the image of the normal eye, and it is impossible to fuse the two images and obtain binocular vision. With a microcorneal lens this disparity in size of the images is overcome, and binocular vision is possible. A similar state of affairs applies in anisometropia, when there is a large difference between the refractive error in the two eyes.

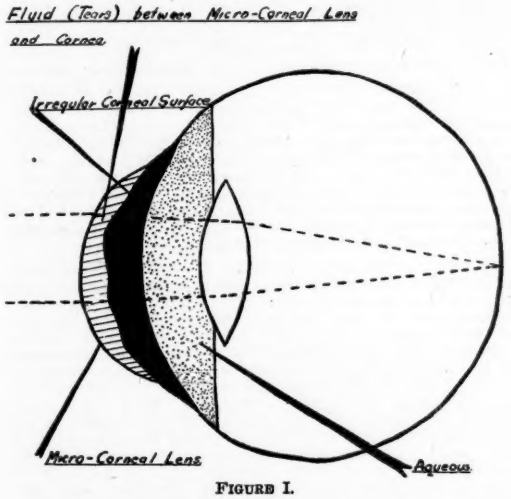

FIGURE I.

High Myopia and High Hypermetropia.

In people affected by high myopia and high hypermetropia, owing to the high power of their lenses their visual field is reduced, as they have to look through the centre of the lens to see clearly, for when they look through the periphery of the lens there is a lot of prismatic distortion. Also the image, seen by myopes, is much smaller, and that seen by hypermetropes much larger, than that seen by an emmetrope. I have found that many of these people will accept a much more accurate and full refractive correction with microcorneal lenses than they will with ordinary spectacles. Most patients wear the same set of corneal lenses for five to ten years without any change in the refractive error.

Corneal Scarring, Mustard Gas Keratitis, Irregular Astigmatism.

In all these conditions, owing to the fact that there is fluid (tears) between the microcorneal lens and the irregular surface of the cornea, the irregularities in the corneal surface are ironed out, and the rays of light are refracted by the regular microcorneal anterior surface and then by the posterior surface of the cornea and aqueous and lens (see Figure I).

Proposed Corneal Grafts as a Diagnostic Aid.

Temporary fitting of corneal lenses during the pre-operative examination of these patients will eliminate surface irregularity, and more accurate information can be obtained as to the plane in which defects lie. Also, a direct comparison can be made between the apparent thickness of the cornea and the corneal lens by means of the slit-lamp beam. Estimate of corneal thickness can be obtained in this way, and this may be of great value, particularly in a lamellar keratoplasty. The thickness of a corneal microlens is 0·25 mm. All patients who are to have corneal grafts should be examined pre-operatively with corneal lenses, to see whether or not the vision can be improved. According to Ridley, in about one-third of these cases the visual acuity can be improved to 6/18 or better, and these people can be given adequate sight without operation.

Vocational and Cosmetic Uses.

The use of microlenses for sporting activities, such as football, tennis, squash and acting, etc., is well known.

Contraindications.

There are some contraindications to the use of microcorneal lenses. Children under the age of 14 years are usually not good subjects for precorneal lenses, although I have personal knowledge of a child, aged nine years, who is able to wear them all day. It is undesirable to use them after an injury to the cornea which results in recurrent erosion, or in cases of nævus near the limbus, or of pterygium. The best subject for microcorneal lenses is the person who has the necessary optical indication, but who also has a strong motive or desire to wear them, whether purely for cosmetic reasons, or because of the vast improvement in vision which is obtained with them. There is no getting away from the fact that there is an initial period of discomfort in building up tolerance to the lenses, and the person who has not a strong motive to wear them will not put up with this initial period of achieving tolerance to the lenses. The risk of corneal abrasion is minimal with these lenses. According to a survey carried out by Westsmith in America, 0·1% of a series of 553 patients developed corneal abrasions. One sometimes observes mild epithelial stippling, unassociated with symptoms, which may necessitate a reduction in wearing time, or an alteration to the base curve of the lens for a better fit of the lens.

Summary.

A new type of contact lens is described, which has a much longer wearing time than those previously used. The indications and contraindications for the prescribing of microcorneal lenses are discussed.

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Reports of Cases.

ACTINOMYCOSIS OF THE LIVER: A REPORT OF TWO CASES.

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IN 1958 M. Scott-Young reported a case of actinomycosis occurring in Australia, and reviewed the bacteriology, epidemiology and pathology of this disease. The following two cases of actinomycosis are reported, as the patients were severely ill and the condition remained undiagnosed for three months and two years respectively. Moreover, intensive investigation led to the correct diagnosis, and penicillin therapy in high doses caused the condition to respond dramatically. Both patients have remained well.

Case I.

A., a grocer, aged 37 years, was admitted to the Royal Melbourne Hospital in December, 1959, with a five weeks' history of right-sided abdominal pain, vomiting and fever, and the loss of 12 kg. in weight. The liver was tender and enlarged to 4 cm. below the right costal margin. The leucocytes numbered 40,000 per cubic millimetre, liver function tests gave normal results, and tests for amœbic infection and hydatid disease gave negative results. X-ray examination showed a central elevation of the right dome of the diaphragm.

A laparotomy revealed only enlargement of the liver. However, repeated exploratory needling of the liver disclosed an abscess in the right lobe containing 180 ml. of thick yellow pus. No microorganisms were found on examination of smears and culture of the pus. The patient's condition improved, and he was discharged from hospital on the twenty-second day after operation. He was readmitted one week later, with fever, pain under the right costal margin and in the right shoulder, increased drainage from the abscess and the coughing up of thick purulent sputum. Sinograms showed a fistula between the hepatic abscess and the bronchial tree. The area was displayed at operation and drained, and on this occasion anaerobic culture of the pus in fluid media yielded *Actinomyces israeli*. Penicillin therapy was commenced, with daily doses of 9,000,000 units of crystalline-procaine penicillin G by intramuscular injection and 4 grammes of penicillin V by mouth, and was continued for six weeks. The symptoms subsided completely. Two months afterwards the patient was in excellent health and had gained 10 kg. in weight, and there were no abnormal findings in the chest or abdomen.

Case II.

B., a country youth, aged 14 years, was examined in March, 1952, at the Royal Melbourne Hospital. For four months he had suffered from fever, anorexia and pain under the right costal margin becoming severe over the past week, and had lost 3·6 kg. in weight. Tenderness and rigidity were present in the right hypochondrium, and there was a round, firm mass extending to the umbilicus. Laparotomy revealed an appendiceal abscess attached to the under surface of the liver. Microscopic examination showed acute appendicitis and an argentaffin carcinoma. Recovery was uneventful. The patient was readmitted to hospital seven times in the next two and a half years, and twice more in 1952 because of night sweats and loss of weight. On these two occasions laparotomy revealed white deposits in the liver, which were thought to be metastatic argentaffin carcinoma; but biopsy showed chronic inflammation only. During two admissions to hospital in 1953 investigation was fruitless, but the condition responded temporarily to a short course of chemotherapy. Subsequently he developed a right subphrenic abscess and basal consolidation of the right lung. He was treated by surgical drainage and brief chemotherapy, again with temporary remission.

Finally, in August, 1954, he presented with sharp pain in the left side and shoulder of one week's duration. At this fifth operation abscesses in the left subphrenic space and pleural cavity were drained, and pus from both sites contained *A. israeli*. Six million units of crystalline penicillin G were given daily for three months. He rapidly improved and gained 9·5 kg. in weight. He remained in excellent health, and when examined four years later he had gained 14 kg. in weight, and liver function tests gave normal results.

Comment.

In Australia, chronic suppuration due to *A. israeli* is a rarely diagnosed cause of abdominal disease. The variety of signs and symptoms obscures the diagnosis, and the microorganism is hard to detect by smear and culture.

Both patients in this report were severely ill, with intraabdominal suppuration. The correct diagnosis was revealed, after careful examination and anaerobic culture of the pus, as being actinomycosis. Then a gratifying cure was obtained in both cases by surgical drainage of the abscesses and a prolonged course of penicillin in high dosage.

Acknowledgements.

I am particularly grateful to Mr. J. O. Smith, Mr. Grayton Brown and Dr. Ian Wood for permission to publish these case reports, and to Dr. D. Hicks for the report on the pathology. I also thank Dr. Ian Wood for his help.

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Preliminary Communications.

THE USE OF AEROSOLS IN HOSPITAL WARDS AND OPERATING THEATRES.

IN view of a recent communication in the *Technical Service Bulletin of Hospital Pharmacists*, Victoria, on a ward-spraying device, we think that it is necessary to issue a preliminary report on work carried out at St. Vincent's Hospital, Melbourne, over the past two years.

Two types of aerosols have been investigated, as follows.

1. A pressure pack of "Hibitane" (1%) in absolute alcohol. This has been shown to give "flash sterility". It is a slight irritant and needs to be kept away from the face. The main use of this pack is as a spot disinfectant, especially during the ward dressing round, when it can be used to sterilize the skin, the bed or personal clothing adjacent to the wound area, etc. It also finds use in disinfecting laboratory benches, beds and mattresses and contact clothing opposite sites of furunculosis or carbuncles. Its disinfecting power is 100% on vegetative organisms.

2. A ward or theatre "fogging device". This is used in two different ways. Surgical wards are "fogged" thrice daily with an aqueous solution of "Hibitane" (1:1000); no inconvenience to the patients occurs, and no sensitivity has been observed over 18 months of use. This results in an over-all drop of at least 50% in both airborne organisms and organisms present on textiles. It therefore reduces the hazard of bed curtains on fixed runners. The second use of "fogging" is in the operating theatres. Here a 1% aqueous solution of "Hibitane" is atomized, and the theatre is closed for five minutes. After this it is ready for use again. This does away with the time-consuming conventional "wash-down" treatment of dirty theatres, and is, in fact, more effective according to tests of air samples and contact samples. At 1% concentration the "Hibitane" solution is irritating to the respiratory tract mucosa, but if two gauze masks are worn, this effect is vitiated. One case of sensitivity occurred in a nurse with a highly allergic history.

The following two "fogging devices" were tested: (*a*) The "Microjet Atomiser", supplied by Diversey & Co. at a cost of £75. This was the more manageable device; it was much quicker to use, and is recommended for large hospitals. (*b*) The "Madewell Atomiser", supplied by Hunter Products at a cost of £50. This is less effective and more tedious to use, but is suitable for a small hospital, or for permanent use in the operating theatre of a large hospital, where it can be used by the nursing staff as required.

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Reviews.

Heroic Sanctity and Insanity: An Introduction to the Spiritual Life and Mental Hygiene. By Thomas Verner Moore; 1959. New York and London: Grune and Stratton, Incorporated. 8½" x 5¼", pp. 256. Price: $5.00.

FATHER THOMAS VERNER MOORE, already the author of several books on psychology, psychiatry and religion, and formerly Head of the Department of Psychology and Psychiatry and Director of the Child Guidance Centre at

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the Catholic University of America, Washington, is now a Carthusian. In this book he combines his insights as a Roman Catholic priest and as a psychiatrist in an attempt to show the meaning of heroic sanctity and the part it can play in the prevention and therapy of mental disorders, either alone or when combined with psychiatric therapy. In his preface he states that the book is intended for all who are striving for spiritual perfection, and he hopes, too, that clergy and psychiatrists will be helped to understand each other's work so that they can utilize this knowledge in the psychiatric and spiritual therapy of the mentally ill.

Part I consists of 12 chapters which give a clear and penetrating outline of Roman Catholic convictions about saintliness and its components of faith, hope, charity, virtue, service, fortitude, reason and prayer. Part II attempts a brief review of some of the common psychiatric syndromes, and of how the religious life and sanctity can help in prevention and cure. For instance, the author describes war neurosis as an evasion reaction which a saintly, heroic man would avoid. He makes little mention of unconscious psychodynamic mechanisms. Part II is likely to disappoint psychiatrists, because his approach is that of an earlier generation of psychiatrists. For instance, schizophrenia is spoken of as dementia præcox. Some modern psychiatrists will agree with his criticism of Freud for regarding religion as merely a rationalization of basic instinctive drives; but he fails to evaluate Freud's true contribution. St. Thomas' *"Summa Theologica"* is Father Moore's most frequent source of quotations, though he has obviously read widely and deeply in other religious and psychiatric literature as well. Part II is likely to disappoint laymen also, because of the free use of technical psychiatric terms with little explanation of their meaning.

Part III is a study of the life of St. Theresa of Lisieux, a French girl of the latter part of the nineteenth century, who became a Carmelite nun and was canonized after her death. These chapters are largely a rebuttal of Father Robo's claim that St. Therese was neurotic and had a mental breakdown. Father Moore writes with sympathetic and convincing insight; but those who wish to decide for themselves will have to read Father Robo's and other biographies of St. Theresa.

The book is well bound and printed, and is provided with a useful index.

Tumors of Childhood: A Clinical Treatise. By Harold W. Dargeon, M.D.; 1960. New York: Paul B. Hoeber, Inc. 10" × 6¾", pp. 488, with illustrations. Price: $20.00.

THIS textbook on the clinical aspects of tumours in childhood is the first to have been published from the viewpoint of the pædiatrician. Probably no one has ever been better qualified to write such a book than Dr. Harold Dargeon. As Chief of the Pediatric Service of the Memorial Hospital for Cancer and Allied Diseases in New York for 25 years, he has had a unique experience of children with tumours, and he has made valuable original contributions.

Part I of this book consists of 80 pages devoted to general considerations. These include the fundamental aspects of cancer, its ætiology and pathogenesis, its incidence and classification; general considerations concerning diagnosis, clinical course and prognosis; and the principles of management. The practitioner will find this part of the book most helpful, particularly the descriptions of radiotherapy and chemotherapy. The section on the difficult problem of the psychological management of the child and of his parents reveals the wisdom and sympathy of the experienced pædiatrician.

In the 350 pages of Part II, specific tumours are dealt with under 13 headings, chiefly on a regional basis. Here a very wide range of malignant diseases is described in a most comprehensive manner on the basis of several thousand cases studied. Such a vast experience is invaluable when it comes to the discussion of the less common tumours. For example, the author is able to quote from knowledge of 190 bone sarcomas, 93 rhabdomyosarcomas and 57 retinoblastomas, whereas few people in this country would have seen even one-fifth of these numbers. His unique experience justifies a helpful dogmatism on many matters which others sometimes regard as debatable; yet there is no lack of modesty shown. There is a good coverage of the literature wherever it is indicated—for example, on the controversial subject of the management of angiomas.

It is inevitable that time has not permitted the inclusion in this large book of any discussion of the latest trials of whole-body irradiation, massive chemotherapy and marrow transfusion, of regional perfusion techniques, and of current antileukæmia régimes that produce remissions in 80% to 90% of cases. However, there are no serious faults in this volume. It is an excellent text-book, profusely illustrated, which will prove most helpful to a wide range of clinicians, including dermatologists and plastic surgeons, to radiotherapists, radiologists and pathologists, and particularly to pædiatricians.

Family Planning. By J. F. Robinson; 1960. Edinburgh and London: E. & S. Livingstone Ltd. 7¼" × 4¾", pp. 64, with illustrations. Price: 3s. 6d. (English).

THE Family Planning Association has supplied much of the material for this pamphlet, which can be read in an hour. It is highly recommended in the foreword by the Professor of Obstetrics at Leeds University, and is an ideal guide to parents both real and prospective.

The scope includes elementary anatomy of the reproductive organs and the physiology of reproduction. The case for planned parenthood is well put. Contraception is not advocated here for the greater enjoyment of illicit intercourse, but on the grounds of happier marital relations, economic expediency and health, as well as on the rather less personal point of world overpopulation. However, Dr. Robinson is careful to point out the dangers of delaying too long in starting a family, and stresses the disadvantages of childless marriage.

Complete abstention and coitus interruptus are frankly discussed and justifiably condemned. Douching after intercourse is regarded as useless. The "safe period" and the various mechanical and chemical contraceptive aids are described extremely well and illustrated by large, clear diagrams. Lists of proprietary products are given which are recommended by the Family Planning Association.

A combination of two reliable methods (mechanical and chemical) is advised as the ideal practice, the sheath being the most effective mechanical device, with the Dutch cap a close second for efficiency and often preferable for æsthetic reasons.

This is a sensible and straightforward book which can neither shock nor fail to inform.

The Sturge-Weber Syndrome. By G. L. Alexander, M.D. (Edin.), F.R.C.S.E., F.R.C.S. and R. M. Norman, M.D. (Bristol), M.R.C.P.; 1960. Bristol: John Wright & Sons Ltd. 9¾" × 7¼", pp. 106, with illustrations. Price: 32s. 6d. (English).

THIS monograph fully describes this uncommon syndrome characterized by the facial skin nævus, epilepsy and calcifications found on X-ray films of the skull.

After an historical background, the clinical records of the seven patients studied are detailed. Then the condition is discussed more generally from its various aspects—radiological, electroencephalographic, pathological and clinical. Surgery was performed in five cases, with favourable effects on epilepsy and mental functions.

The book is well presented, and should become an authoritative work on the subject.

Microbes, Men and Monarchs: A Doctor's Life in Many Lands. The Autobiography of Aldo Castellani; 1960. London: Victor Gollancz Ltd. 8½" × 5¾", pp. 290, with illustrations. Price: 25s. (English).

THOSE familiar with Castellani's paint and Castellani's absorption test will welcome this autobiography of the discoverer of the sleeping-sickness trypanosome. Bacteriologist, dermatologist and tropical health expert, he presents these memoirs which cover half a century of medicine in many countries.

Beginning with boyhood in Florence, Sir Aldo Castellani goes on to describe medical studies in Bonn and London, whence he accompanied an expedition to Equatorial Africa in search of the cause of sleeping-sickness, which he found. There followed a term as Professor of The Medical College of Colombo and Director of the Bacteriological Institute; he devoted his time to improving the treatment for elephantiasis, yaws and tokelau. He describes his personal experiences in the military campaign in Serbia in World War I, and the prevalent malaria, whose prophylaxis under his direction is said to have determined the later success of the Italian invasion of Ethiopia. Post-war Poland, France and a Harley Street practice form the locale of the succeeding chapters till World War II, which took him to North Africa. From Italy he accompanied the Royal Family into exile in Portugal, where he is still personal physician to King Umberto.

Two appendices outline medical aspects of the Ethiopian campaign and the effects of climate on health. Sir Aldo Castellani has managed to preserve the personal element in this autobiography, which could easily have become coldly scientific; but unfortunately his authorship is not outstanding, and the appeal of this work will probably be restricted to those interested in him as a scientific figure, or in the pageant of glittering personalities which passes through the pages—such personalities as Valentino, Mussolini, Empress Eugénie and Marconi.

We wish that there were more photographs, since those which are presented are wonderful human studies, and an index is a regrettable omission. However, doctors will find this new autobiography very readable, and a fascinating review of the work of a great man.

Biochemistry of Blood in Health and Disease. By I. Newton Kugelmass, M.D., Ph.D., Sc.D.; 1959. Oxford: Blackwell Scientific Publications. 10" × 7", pp. 544, with illustrations. Price: £6 6s. (English).

THE biochemistry of the blood is considered in its widest sense in this book. The dependence of concentrations of constituents of the blood on changes occurring in other tissues is emphasized, and modifications of these changes resulting from disease are discussed. Relations between the composition of the circulating fluid of the blood, its formed elements and the fixed tissues are considered. These relations are frequently presented graphically in the diagrams which are a feature of the book.

The composition and properties of blood are dealt with from three aspects of its functions. The first is as a transport system by which substances derived from the main nutrolites of the body (proteins, carbohydrates and lipides) are delivered to the tissues, and by which the end products of metabolism of these substances are conveyed to the organs of excretion. The second is as a regulating system by which the distribution of water is controlled and the appropriate concentrations of substances of osmotic importance are maintained. The elements used in bone metabolism, in the synthesis of blood pigment and in enzyme systems are dealt with in this section. It also includes the discussion of the various hormones of the body. The third is as a defence system. About half this section is devoted to a consideration of the erythrocyte as a carrier of hæmoglobin, and to the occurrence and properties of abnormal hæmoglobins. As hæmoglobin is obviously concerned with the transport of gaseous metabolites and with the regulation of the pH of the circulating blood, its inclusion in this section seems rather arbitrary. The biochemistry of blood groups and of blood transfusion and storage are considered in this section. It also deals with immune bodies associated with infection, with the properties of leucocytes and with details of the process of blood clotting.

Each of the 20 chapters is followed by a list of references. There are comprehensive author and subject indices. In a useful appendix the normal ranges of concentration of about 180 blood constituents are given.

This book presents a wide range of information on the biochemistry of the blood in a very compact but readily accessible form. It is excellently produced.

Recent Advances in Clinical Pathology: Series III. By Various Authors. General Editors: S. C. Dyke, D.M. (Oxon.), F.R.C.P. (Lond.). Section Editors: "Bacteriology", Mary Barber, M.D. (Lond.), F.R.C.P.; "Chemical Pathology", E. N. Allott, D.M. (Oxon.), F.R.C.P. (Lond.), F.R.I.C.; "Hæmatology", Rosemary Biggs, M.D., B.Sc. (Lond.), Ph.D. (Toronto); "Histology", A. H. T. Robb-Smith, M.D. (Lond.), F.R.C.P. (Lond.). 1960. London: J. and A. Churchill Ltd. 8" × 5½", pp 440, with 151 illustrations, including one plate in colour. Price: 50s. net (English).

SOME books are difficult to review because they contain so little, others because they contain so much. The present book belongs in the second category. The wide scope of the book reflects the ever-increasing demands made on the laboratory, not only in the field of diagnosis, but also in assessment of the value of treatment.

This edition, like its predecessors, is divided into four sections, each with its own editor; and here begin the reviewer's difficulties, as each contribution is so valuable that it would be invidious to single out one which perhaps has a more personal appeal than another. The alternative is to make a complete list of contributions. This has already been attended to in the table of contents. The scope of the book is widened by the fact that each article is, in fact, a précis of recent work on the various subjects and is completely documented. For example, the first article, "Staphylococcal Infections in Hospitals" occupies 12 pages, yet contains over 100 references to published work. The remainder of the book follows the same pattern.

Apart from its special appeal to the pathologist, this book will also be found a most useful guide to the clinician. Like its predecessors, it is a complete entity, and not to be regarded either as an extension of them or as a substitute for either. Minor criticism is that the authors do not stress the values of micro and ultra-micro techniques in the section on chemical pathology. The need for these is apparent in the performance of repeated daily tests—for example, in cases of icterus neonatorum. Likewise capillary-tube methods for erythrocyte sedimentation rate estimation receive only a passing reference, without any assessment of their value.

To conclude, this is an excellent book and warrants a place in every doctor's library.

Nitrous Oxide in Dentistry: Its Danger and Alternatives. By J. G. Bourne, M.A., M.D. (Cantab.), F.F.A.R.C.S.; 1960. London: Lloyd-Luke (Medical Books) Ltd. 8½" × 5½", pp. 192 with illustrations. Price: 30s. (English).

"A FRESH Approach to Anæsthesia in Dentistry", the heading of Chapter VIII, could easily have been the main title of this book. Although the volume is termed "Nitrous Oxide in Dentistry; Its Dangers and Alternatives", the theme is to present cyclopropane as the agent of choice. The book represents the publication of Bourne's thesis for a doctorate in medicine, which was attained, and an elaboration of his earlier publications from various journals.

The contents of some 180 pages fully cover the history of anæsthesia for dentistry and the physical and pharmacological properties of the various anæsthetic agents pertaining to this particular method of use. The aim has been to show that, theoretically and in practice, the only agent which satisfies the requirements of minor dentistry is cyclopropane. Bourne states that the main objection, that of explosiveness, has now been eliminated by an elaboration of his original technique, a technique which is indeed far more complicated.

It is certainly true that the mortality and morbidity of nitrous oxide for dental surgery have never been completely elucidated. In a comprehensive survey, the author has attempted to clarify one aspect of the morbidity—that is, delayed recovery. However, eventually he has to estimate the numbers affected, and then proceeds to show the causes of this phenomenon. Some of us are well aware that a fresh approach to anæsthesia in dentistry is required, but we believe that this thesis is not the answer. This modified technique has been used in many thousands of cases, and it has merit and deserves trial.

Unlike the British practice, the number of nasal administrations of nitrous oxide for dental extractions would be small indeed. Reliance in this country is placed on regional analgesia, and indications for the nasal administration of nitrous oxide are strictly defined. Further, except in one State of the Commonwealth, the dental undergraduate is not taught to administer general anæsthetics. The problem is, therefore, not comparable.

The book, from the house of Lloyd-Luke, is well produced, neatly bound and presented, amply illustrated with graphs, tables and photographs, and easy to comprehend. The contents represent a critical approach to anæsthesia for dental extractions, and could well be read by dental graduates and medical practitioners who administer any type of anæsthetic for their dental colleagues. The contents must be read and critically examined by those specialists who believe that they have the answer to this important and current problem. It is maintained that this proposed technique would be of use for those anæsthetists with limited experience. This may be so; by its nature the method, if correctly applied, will certainly limit the amount of surgery which can be done at any one sitting, and this in itself may be of considerable benefit.

Ciba Foundation Symposium on Cellular Aspects of Immunity. Edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., M.R.C.P., and Maeve O'Connor, B.A.; 1960. London: J. & A. Churchill Ltd. 8" × 5½", pp. 508, with 117 illustrations. Price: 60s. net (English).

THE title of this Ciba Foundation Symposium may be a little misleading for those who are preoccupied with the microbiological aspects of immunity, for the symposium is concerned with the cellular basis of the immune response and with the immune response to cells and tissues, and not with

that vague concept to which the name "cellular immunity" has been applied. Broadly, then, two main themes can be discerned in the well-selected titles of this symposium. One concerns the anatomical, functional, biochemical and immunological responses of cells to antigenic stimulation; the other concerns the newly-recognized phenomena of histocompatibility and immunological tolerance.

The publication of this symposium is timely, for the participants include the two Nobel laureates, Burnet and Medawar, whose contributions and influence upon the current approach to immunology are very clearly in evidence throughout.

A consistent attempt has been made to give a logical sequence to the subject matter, beginning with a note by Fragraeus on the terminology of the cells involved in immunological reactions, and proceeding to a consideration of the uptake of antigen by cells, its subsequent degradation, the gross anatomical response to antigenic stimulation, and the ultrastructure of antibody-forming cells. Medawar then gives a closely argued analysis of theories of immunological tolerance. This is followed by a panel discussion on the clonal selection theory of antibody production. Subsequent papers deal with the newer methods of analysing immunological responses by means of cell transfer, and antibody production *in vitro*. Finally there are a number of loosely related topics, all of which have it in common that they deal either with the cellular reactions to antigens, or with the reactions to cellular antigens. Thus Waksman discusses the histopathology of delayed hypersensitivity, while Gorer deals with the interaction between sessile and humoral antibodies in homograft reactions. The few topics which have been mentioned explicitly serve to indicate the scope of this symposium.

The value of an international symposium rests upon the efforts of its participants to state and analyse the most recent experimental findings in the field, and to add some thought-provoking hypotheses to give a basis for future experimental approach. The authors have done well in both respects, and the resulting volume, which has been edited and published with great precision, is perhaps the best so far in this important field.

Outline of Orthopædics. By John Crawford Adams, M.D., F.R.C.S.; Second edition; 1958. Edinburgh and London: E. and S. Livingstone Limited. 8¾" × 5", pp. 436, with 301 illustrations. Price: 35s. (English).

THIS publication well justifies three editions in four years. It is more than a handbook, and yet not so large as to burden the undergraduate with excessive detail and high price.

There is a broad introduction 100 pages in length, followed by eight regional surveys. Each of these opens with a detailed discussion of the clinical methods applicable to that area—a good feature, often lacking in orthopædic textbooks. The diagrams are numerous and clear; especially worth mention are those used to illustrate the problems of regional differential diagnosis. The teaching is, for the most part, orthodox, and controversial viewpoints have been avoided. Treatment is concise and dogmatic, and operative details are wisely omitted at this stage. X-ray reproductions are not equal to the usual standard of this publisher, and many could have been omitted without lowering the standard of instruction. Finally, this book can be recommended as first-rate teaching at undergraduate level.

A Handbook of Pædiatrics for Nurses in General Training. By Q. M. Jackson, D.N. (Lond.); Second edition, 1960. London: H. K. Lewis & Co. Ltd. 7¼" × 4¾", pp. 114. Price: 12s. 6d. net (English).

A HIGHLY qualified and experienced nurse has written this volume as a guide on the care of children in hospital to nurses in general training. Her approach is warm-hearted, her contention being that "the basic principle of successful pædiatric nursing is a deep affection for the child". She abhors regimentation, and believes that each child should be treated as an individual and given the company of other children whenever possible. She advocates parent visiting, and small treats such as birthday parties and special games with staff participation, and urges nurses and doctors to win the small patient's confidence by repairing broken toys or reading stories.

There are chapters dealing quite well with the care of babies, care of children, common medical and surgical conditions and orthopædic problems. The dangers of cross-infection, possibly the most important aspect of children's nursing, are stressed.

Unfortunately there are several features which condemn this book as a standard work for our nurses. The chapter on "Prevention of Disease", with its details of social services available in England, such as free dental care during and after pregnancy, health visitors, free concentrated orange juice, free cod-liver oil and National Dried Milk, is obviously inapplicable here. Some inaccuracies have persisted from the first edition, such as the statement that macrocytic anæmia of pregnancy is cured by taking vitamin B as "Marmite". Elsewhere erythema nodosum is still attributed solely to the tubercle bacillus. Outdated methods, like the penny treatment for umbilical hernia, are given, and these detract enormously from the value of the book. The proof-reading has been poor. The grammar and spelling are faulty —we read about "nystation", "casual organisms" and an intriguing one—"antiphagestine poultices". The subheadings are badly systematized, the whole effect being confusing and untidy.

With all its merits, and there are many, particularly the plea for kindness to little patients, we think that this book has little place in the training of nurses in this country, whose needs are adequately met by the standard texts.

The Physiological Basis of Diuretic Therapy. By R. F. Pitts, Ph.D., M.D.; 1959. Springfield: Charles C. Thomas. Oxford: Blackwell Scientific Publications Ltd. 9" × 5¾", pp. 346, with illustrations. Price: 78s.

THE discovery of the potent and consistent diuretic effect of organic mercurials 40 years ago led to one of the most satisfactory therapeutic procedures in modern medicine. The recent introduction of the sulphonamyl diuretics represents another advance of comparable magnitude. During the intervening period, there has been brilliant advance in the knowledge of renal physiology and its relationship to water and electrolyte balance, acid-base disturbances and œdema. This has been most fortunate in permitting considerable understanding of the physiological action of the newer diuretics and also the physiological basis of their side effects. At the same time, the diuretics themselves have been a valuable tool contributing to the study of the function of the nephron. Robert F. Pitts, Professor of Physiology at Cornell Medical College, has played a prominent part in research in the general field of renal physiology and in the specific field of diuresis. There could be none better qualified to review and correlate knowledge in these two fields.

In Part I of the present book there is a lucid discussion of basic physiology in relation to chemical equivalence, osmotic pressure, ionic transfer and balance across cell membranes, hæmodynamics, vasomotion and œdema. The newer concepts of tubular function, including enzyme and electromotive aspects of electrolyte and water transfer across the tubule and current views on urine-concentrating mechanisms, are discussed. This part concludes with a chapter on renal factors in œdema; basically, diuresis or antidiuresis must be due to glomerulo-tubular imbalance, and throughout the book all aspects of the subject are considered in terms of this concept.

Part II deals with pharmacological, physiological and therapeutic aspects of the various groups of diuretics. The organo-mercurials are treated in great detail. While it is true that they are in effect chloruretic, the author's view is that their specific action is the blockage of sodium reabsorption in the proximal tubule. Acetazoleamide acts specifically on the enzyme carbonic anhydrase, while chlorothiazide combines both mechanisms, though it affects a sodium transport area distinct from that of the mercurials and thereby supplements their effect. The rôle of steroids is reviewed, though not as fundamentally as that of most other agents. Osmotic diuresis, while of little importance therapeutically, is discussed in detail because of its importance as a factor in the pathogenesis of renal failure.

The style is simple and clear and the chapters are relatively short. A summary and references are appended to each. The book is a valuable review of modern renal physiology, as well as a practical guide to diuretic therapy.

Food for Longer Living. By R. C. Hutchinson, D.Sc. (Melb.); 1960. Parkville: Melbourne University Press: London and New York: Cambridge University Press. 7¼" × 4¼", pp. 110. Price: 5s. 6d.

OVER the past few years, increasing interest has been shown in studying the food requirements of elderly people. A simply-written book embodying the results of these studies could be very useful. R. C. Hutchinson has endeavoured to supply this in the present book of 98 pages. The author divides his material into six sections: "Nutrients and their Sources"; "Bodily Changes with Increasing Age"; "Foods Having Special Claims"; "Energy Requirements for Adults"; "Desirable Feeding Patterns and Special Problems for the

Aged". The author has used data from a number of publications which have appeared during the past few years, but he is not very critical in his selection.

Most of the book could be taken as a popular guide to dietetics for people of any age, and the author has presented this much better in three other books he has written. The book gives one the impression that it has been written hurriedly and poorly edited. There is much repetition, and some very doubtful claims are made. There is much that is useful in the book, but it cannot be recommended when better accounts are available.

Relaxation for Childbirth. By Mary Barfield, M.Phys.A., with an introduction by Dr. Cyril Pink; 1960. London: William Heinemann Medical Books Ltd. 7⅝" x 5", pp. 152, with illustrations. Price: 12s. 6d. (English).

ANOTHER experienced and gifted teacher writes yet another book, with an introduction by yet another medical expert, on this controversial topic. It is directed to expectant mothers, and the author justifies this addition to the swelling volume of literature prepared for these readers on the ground that, since teaching is a personal matter with different approaches suiting different pupils, so her methods may benefit many people who do not receive complete help from other books. However, she emphasizes that books cannot take the place of a practical class, if this is available.

This volume is written in an easy, conversational style—indeed, the lessons are those delivered to Miss Barfield's own classes, almost verbatim. On this count they are lengthy and perhaps excessively detailed; but this type of writing is probably better suited to the teaching of a practical art than the more concise textbook style adopted by some other authors.

The exercises given are to assist in breathing and relaxation during the first stage of labour, and in pushing during the second. The reason for every movement is fully explained with text and illustration, and each lesson concludes with "extracts from letters" written by grateful pupils.

An unusual feature is the stress laid on relaxation for breast feeding, which is taught at some length. Miss Barfield addresses a plea to maternity staff to assist the "trained mother" who has prepared herself for a natural childbirth to achieve her object by complying with her wishes, instead of discouraging her and showing lack of confidence in the methods in which the mother believes.

If a doctor is desirous of recommending relaxation literature to his maternity patients, we think that this book is at least as good as any other he could choose.

Notes on Books.

"Jungle Doctor Panorama". Text by Paul White, photographs by Ossie Emery and Edwin Udey; 1960. London: The Paternoster Press. 11" x 8½", pp. 144, with many illustrations in black and white and colour. Price: 49s. 9d.

SUPERB is the only word for many of the photographs in this book, and the rest—there are several hundred in all, black and white, and coloured—are all first class. Described as "a window on Africa today", it is essentially a book about people, the people of East Africa, especially as they are seen in and through the windows of the eight hospitals of the Church Missionary Society in Tanganyika. We are brought face to face with the men and women, black and white, who work in the hospitals as a team; with the men, women and children who come to the hospitals for healing in body and spirit; and with the African people in their own environment.

Besides the people some of the wild animals of Africa appear on their own terrain in remarkable pictures—lions, giraffe, zebra, the elephant and the rhinoceros, and what we take to be a gazelle in a panoramic study that would be hard to excell.

The letterpress is minimal, but says pithily all that needs to be said. The layout is excellent, and the production is a printer's triumph. The appearance of this book marks the production of the millionth copy of the Jungle Doctor series and the translation of these books into the fifteenth language. "Jungle Doctor Panorama" would make an excellent Christmas present.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Expert Committee on Tuberculosis: Seventh Report", World Health Organization Technical Report Series, No. 195; 1960. Geneva: World Health Organization. 9¼" x 6¼", pp. 20. Price: 1s. 9d.

"Intraspinal Tumours of Childhood", by Robert W. Rand, M.D., Ph.D., and Carl W. Rand, M.D.; 1960. Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications Ltd. 10" x 6¾", pp. 578, with many illustrations. Price: £6 12s.

"Alcoholism: A Compilation of Papers Presented to the National Conference on Alcoholism at the University of New South Wales on 8th-12th August, 1960, convened by The Foundation for Research and Treatment of Alcoholism"; 1960. 9¼" x 6¼", pp. 188. Price not stated.

"Distribution and Kinetics of Bromide Ions in the Mammalian Body: Some Experimental Investigations using Br^{80m} and Br^{82}", by Rune Soremark; *Acta radiologica*, Supplementum 190; 1960. Stockholm: Acta Radiologica. 10" x 7", pp. 114, with illustrations. Price: Sw. Kr. 30:-.

"Attainment and Value of Precision in Deep Radiotherapy: Some Fundamentals with Special Reference to Moving Beam Therapy with 200 to 250 kV Roentgen Rays and Cobalt 60 Gamma Radiation", by Olov Dahl and Karl Johan Vikterlöf; *Acta radiologica*, Supplementum 189; 1960. Stockholm: Acta Radiologica. 10" x 7", pp. 224, with many illustrations. Price: Sw. Kr. 35:-.

"Jens Nielsen: Anno Aetatis Suae LX: Papers Dedicated to Jens Nielsen, Professor of Radiotherapy at the University of Copenhagen, on his Sixtieth Anniversary, December 19, 1959"; *Acta radiologica*, Supplementum 188; 1959. Stockholm Acta Radiologica. 10" x 7", pp. 284, with many illustrations. Price: Sw. Kr. 40:-.

"Radiologic Pelvimetry", by Ulf Borell and Ingmar Gernström; *Acta radiologica*, Supplementum 191; 1960. Stockholm: Acta Radiologica. 10" x 7", pp. 98, with many illustrations. Price: Sw. Kr. 30:-.

"Pleural Calcification as a Roentgenologic Sign of Non-Occupational Endemic Anthrophyllite-Asbestosis", by Raimo Kiviluoto; *Acta radiologica*, Supplementum 194; 1960. Stockholm: Acta Radiologica. 10" x 7", pp. 68, with many illustrations. Price: Sw. Kr. 25:-.

"The Tomogram: Its Formation and Content", by Paul Edholm; *Acta radiologica*, Supplementum 193; 1960. Stockholm: Acta Radiologica. 10" x 7", pp. 110, with many illustrations. Price: Sw. Kr. 30:-.

"Renal Papillary Necrosis: A Roentgenographic Study of 155 Cases", by Nils Lindvall; *Acta radiologica*, Supplementum 192; 1960. Stockholm, Acta Radiologica. 10" x 7", pp. 154, with many illustrations. Price: Sw. Kr. 30:-.

"Roentgenographic Studies on Epiphysial Growth and Ossification in the Knee", by Sven Scheller; *Acta radiologica*, Supplementum 195; 1960. Stockholm: Acta Radiologica. 10" x 7", pp. 304, with many illustrations. Price: Sw. Kr. 35:-.

"Chemotherapy in Emotional Disorders: The Psychotherapeutic Use of Somatic Treatments", by Frederic F. Flach, M.D., F.A.P.A., and Peter F. Regan III, M.D., F.A.P.A.; 1960. New York, Toronto, London: McGraw-Hill Book Company Inc. 9" x 6", pp. 328. Price: $10.00.

"Bulletin Signalétique (Anciennement Bulletin Analytique)", Volume 21, Number 9, Part 2, "Sciences biologiques, Sciences pharmacologiques, Industries alimentaires, Agriculture", 1960. Paris: Centre de Documentation du C.N.R.S. 10¾" x 8¼" pp. 618. Price not stated.

"The Problem of Methæmoglobinæmia in Man with Special Reference to Poisoning with Nitrates and Nitrites in Infants and Children", by Douw G. Steyn, B.Sc., Dr.Med.-Vet., D.V.Sc.; Publications of the University of Pretoria, No. 11; 1960. Pretoria: Universiteit Van Pretoria. 9¼" x 7¼", pp. 32. Price not stated.

"A Textbook of Histology: Functional Significance of Cells and Intercellular Substances", by John C. Finerty, and E. V. Cowdry; fifth edition; 1960. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson Ltd. 10" x 6¾", pp. 574, with 502 illustrations. Price: £6 1s.

"Current Medical Research: A Reprint of the articles in the Report of the Medical Research Council for the Year 1958-59"; 1960. London: Her Majesty's Stationery Office. 9¼" x 6", pp. 56, with illustrations. Price: 3s. 6d.

The Medical Journal of Australia

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MURINE TYPHUS IN AUSTRALIA.

A LANDMARK in the history of murine typhus was the report by F. S. Hone[1] in 1922 of 16 cases "closely resembling typhus fever" in Adelaide. These were the first described in Australia, although not in the world. K. F. Maxcy,[2] for instance, has listed seven reports from 1912 to 1917 of "typhus" in American States in which the murine type was later shown to be endemic; on geographical evidence most or all of the 19 cases in these reports may be accepted as murine. Also, A. Pijper and H. Dau[3] consider that an outbreak in the Transvaal described in 1911 was murine typhus. Hone[4] reported 21 further cases in 1923 and 81 in 1927. A further original feature of Hone's work, in which he appears to have absolute priority, is his recognition of an association of rats and mice with the disease. This became clear to him by the middle of 1923 and was mentioned in a *questionnaire* drawn up early in 1924 for use in investigation of cases. It was not, however, published in the medical Press until August, 1927. Maxcy[5] developed independently the hypothesis of a rodent reservoir and published it in December, 1926. In 1925, W. Fletcher and J. E. Lesslar[6] reported that there were large numbers of rats in localities where cases of "tropical" typhus arose, and suspected them to be reservoirs of infection. The context shows that they were dealing with "rural" or "scrub" typhus, and thus the priority of Hone's association of rodents with "murine" typhus is not challenged. Rodent association was again noted in the next Australian report of murine typhus. In 1925, F. T. Wheatland[7] studied 38 cases in the Toowoomba district and estimated that about 200 cases had occurred altogether. The outbreak coincided with a plague of mice.

To set Hone's contribution in perspective, some other important landmarks in the early history of murine typhus may be noted. In 1917, M. H. Neill[8] reported that guinea-pigs inoculated with two Mexican strains of typhus developed inflammation of the scrotum. In 1928, H. Mooser[9] confirmed this, and demonstrated a minute intracellular diplobacillus resembling *Rickettsia prowazeki* in sections and smears of the inflamed tunica vaginalis. The organism was named *Rickettsia mooseri* by J. L. Monteiro.[10] The Neill-Mooser scrotal reaction proved to be a good diagnostic sign of murine typhus; it was rarely observed in guinea-pigs infected with classical typhus. Maxcy, in a notable series of reports from 1923 to 1929, defined the clinical features and epidemiology of the "endemic" typhus of south-eastern United States, and clearly distinguished it from the "epidemic" typhus of the old world. At first, "endemic" typhus and Brill's disease were regarded as identical, but reports by H. Zinsser and M. R. Castaneda[11] showed that the infecting agent in Brill's disease was *R. prowazeki* and that the illness was a recrudescence of an earlier attack of classical typhus in Europe. In 1931, the first isolation of *R. mooseri* from a rodent was reported by H. Mooser *et alii*.[12] They isolated two strains, each from a pool of two *Rattus rattus* trapped in Belem prison in Mexico City. In the same year came the first isolation from rat fleas by R. E. Dyer *et alii*[13] in Baltimore. The fleas were a mixture of *Nosopsyllus fasciatus* and *Xenopsylla cheopis*. The latter has been shown to be the main vector to man. Rickettsiæ can multiply enormously in it, so that 1/128,000 of a flea can infect a guinea-pig. Transfer from rat to rat by this and other fleas has been demonstrated in the laboratory. Deprived of its natural host *X. cheopis* will readily attack man. The American observations were quickly confirmed elsewhere, particularly by French investigators. *R. mooseri* was isolated from *R. rattus* or *R. norvegicus* in Athens, Beirut, Bordeaux, Casablanca and other cities, from rats on two French cruisers on which cases of "ship" typhus had occurred, and from *X. cheopis* in Athens and Alexandria. With the recognition that the disease was a natural infection of rats, the name "murine" typhus came into general use.

A recent review of murine typhus in Australia by E. H. Derrick[14] states that 689 cases were notified in the eleven years 1948 to 1958. These came from Western Australia (316), Queensland (224), New South Wales (93), South Australia (49) and Victoria (7), with none from Tasmania. This period has seen a steady decline in the annual total, from 148 in 1948 to 18 in 1958, reflecting a sustained campaign against rodents and their parasites. The first report of the disease in Western Australia—an outbreak of 17 cases in Perth and Fremantle—came from K. R. Moore[15] in 1927. The prevalence of the disease in this State provided E. G. Saint *et alii*[16] with material for a comprehensive review of its epidemiological and clinical features. The metropolitan area supplied most cases. There were also foci at Geraldton, Albany and Bunbury and occasional cases from wheat and dairying areas. Since 1955, the distinction of having the highest

[1] MED. J. AUST., 1922, 1:1 (January 7).
[2] *Pub. Hlth. Rep.* (*Wash.*), 1928, 43:3084 (November 23).
[3] *J. Hyg. Camb.*, 1935, 35:116 (February).
[4] MED. J. AUST., 1923, 1:435 (April 21); 1927, 2:213 (August 13).
[5] *Pub. Hlth. Rep.* (*Wash.*), 1926, 41:2967 (December 24).
[6] "Bulletin No. 2 of 1925, Institute of Medical Research F.M.S."
[7] MED. J. AUST., 1926, 1:261 (March 6).
[8] *Pub. Hlth. Rep.* (*Wash.*), 1917, 32:1105 (July 13).
[9] *J. infect. Dis.*, 1928, 43:261.
[10] *Mem. Inst. Butantan*, 1931, 6:97.
[11] *New Engl. J. Med.*, 1933, 209:815 (October 26); *Amer. J. Hyg.*, 1934, 20:513 (November).
[12] *J. Amer. med. Ass.*, 1931, 97:231 (July 25).
[13] *Pub. Hlth. Rep.* (*Wash.*), 1931, 46:334 (February 13).
[14] *Arch. Inst. Past. Tunis*, 1959, 36:361 (December).
[15] *Health, Melb.*, 1927, 5:109 (July).
[16] MED. J. AUST., 1954, 2:731 (November 6).

annual total has passed to Queensland. Cases have occurred at most coastal cities, as well as at such inland centres as Toowoomba, Kingaroy (peanuts) and Cloncurry (pastoral and mineral). In 1937, there were five cases among miners in a coal mine near Ipswich. A persistent endemic area is the Atherton Tableland, where maize and peanuts are grown, and fields and storages are liable to provide food for rodents. The main endemic centres in New South Wales are Sydney and the north-east corner of the State. Cases are now rare in South Australia; the prevalence in Hone's time may be ascribed to special circumstances then—the enormous wartime storage of wheat which could not be exported and became infested with mice and rats.

The association of rats with murine typhus has been commonly noted in Australia, and confirmed by the isolation of *R. mooseri* from *R. norvegicus* in Brisbane, and by the detection of specific complement-fixing antibodies in rats in Melbourne and in five Western Australian localities. There have been few specific studies on fleas in relation to Australian outbreaks of murine typhus. C. Strickland[17] found that mice in Toowoomba at the time of Wheatland's epidemic were infested with *Leptopsylla segnis*. D. W. Johnson collected *X. cheopis* from *R. rattus* in the Ipswich coal mine where cases had occurred; guinea-pigs inoculated with them remained uninfected. *X. cheopis* and *L. segnis* were found on rats in Perth and Fremantle by K. R. Moore and E. P. Hodgkin (reported by D. J. R. Snow[18]). D. J. W. Smith noted the infection of some cat fleas, *Ctenocephalides felis*, that were feeding on an experimentally infected rabbit.

In general, the geographical distribution of murine typhus in Australia, as in the United States, corresponds to that of *X. cheopis*. This flea favours the tropics; it becomes progressively less abundant with increasing latitude and is rare in Melbourne. Typhus cases have been uncommon south of 35° S., the latitude of Albany and Adelaide. These places have mean annual temperatures of 15·6° C. and 17·3° C. respectively. A few well-authenticated cases have arisen in Melbourne; its latitude of 37·8° S. and isotherm of 14·9° mark the southern limit of murine typhus in Australia. In Sydney, *X. cheopis* was found to be present throughout the year on rats and most abundant in summer and autumn, and this is the period when murine typhus has been most frequent in Adelaide, Perth, Brisbane and Sydney. However, there are two interesting deviations from the standard seasonal pattern. In Toowoomba the peak incidence of typhus has been in midwinter, when *X. cheopis* would be rare, and in Atherton from November to January. A study of typhus in the Toowoomba area by E. H. Derrick and J. H. Pope appears elsewhere in this issue (see page 924); the situation in Atherton invites investigation.

Murine typhus has a low mortality in young people, but it can be a serious disease in the elderly. There were eight deaths (6·8%) in Hone's combined series of 118 cases; the ages of the eight people who died ranged from 42 to 71 years. Saint noted an over-all mortality rate of 3·7% in 1332 cases; it rose to approximately 10% in subjects over 50 years of age. All Hone's and nearly all Saint's cases preceded the era of effective antibiotics. The mortality should be much less in future series. At present the incidence of the disease is declining, but the possibility of outbreaks if controls are relaxed is illustrated by the original experience with wheat storage in Adelaide, the war-time increases in Perth, Brisbane and Sydney, and the widespread endemicity in farming areas in three States. One is reminded of the warning and promise with which H. Zinsser[19] concludes his "biography" of classical typhus:

> Typhus is not dead. It will live on for centuries, and it will continue to break into the open whenever human stupidity and brutality give it a chance, as most likely they occasionally will. But its freedom of action is being restricted, and more and more it will be confined, like other savage creatures, in the zoological gardens of controlled diseases.

[17] "Transactions of the Seventh Congress of the Far-East Association for Tropical Medicine", 1927, 2: 517.

[18] "Report of the Commissioner for Public Health for Western Australia", 1953: 72.

[19] "Rats, Lice and History", 1935, Routledge, London.

Current Comment.

QUEEN SQUARE AND THE NATIONAL HOSPITAL, 1860–1960.

ONE HUNDRED years ago the National Hospital for Nervous Diseases came into being purely for the sake of humanitarian reasons, as soon as it was realized that many unfortunate sufferers from the disabling effects of paralysis or epilepsy were unable to obtain adequate care and treatment in their own homes. It happened that a few particularly gifted members of the profession were at this time accumulating knowledge and extending the technical possibilities for advance in some branch of medicine or surgery in order to establish themselves as specialists. As a consequence of the new tendency to specialism in medical practice, able physicians sought appointment to the honorary staff of the thriving hospital in Queen Square, and in opening up an unexplored avenue of scientific endeavour they set themselves and their hospital well on the way to international fame.

In one of the choicest, shortest and most comprehensive forewords ever penned to give tone and respectability to a new publication,[1] Sir Ernest Gowers, a son of Sir William Gowers, who became the hospital's first registrar in 1870, and then one of the founders of the new science of neurology, makes this observation in the course of his remarks: "The history of the hospital has been told before; so has that of the Square in which it stands. But this is the first time that they have been dovetailed into a single chronicle, which is enriched by historial material not previously collated and hitherto unpublished illustrations." Besides his long family association with the National Hospital, Sir Ernest was at one stage of his career chairman of directors, while in another sphere of activity he has rendered distinguished public service to his country.

This small commemorative volume is well written and has been handsomely produced. It cannot be described as a connected history in the ordinary sense, but its fascination lies in an uncommon way of presentation which gives a detailed account of the gradual growth of this quiet and secluded corner of Bloomsbury in the heart of early eighteenth century London, with its fine Georgian mansions all facing a rectangular garden plot made attractive with trees, flowers and lawns. Frequent references are made to the long line of distinguished personages who at one time or another have lived in

[1] "Queen Square and the National Hospital, 1860-1960", with a foreword by Sir Ernest Gowers, G.C.B., G.B.E.; 1960. London: Edward Arnold (Publishers) Ltd. 8¼" × 5¼", pp. 124, with illustrations. Price: 30s. (English).

this once fashionable quarter of the city. A story is told of the famous musician, Dr. Charles Burney, who was father of the more familiar Fanny Burney, and whose friends Oliver Goldsmith and David Garrick were frequent visitors to his home in Queen Square. On one occasion he was entertaining Captain James Cook at dinner when a lively discussion took place concerning the rival circumnavigator, M. de Bougainville, a copy of whose book "*Voyage au tour du Monde*" was produced by Dr. Burney. This book is now preserved as a national treasure, for the famous explorer made his points by using some of the blank spaces to insert numerous sketches with his own annotations on his first voyage of discovery round the world.

The rest of the book is mostly of a biographical nature and is concerned with the development of the hospital and its work. The story opens with that remarkable family of Chandlers, described by Gowers as "a very ordinary family of two sisters and a brother, of modest means and without influence, [who] brought about through their own private exertions, the greatest neurological centre in Great Britain—a centre indeed that within half a century had become known all over the world". Lastly, there are several short biographical sketches of the men who served the hospital and helped to bring modern neurological medicine and surgery into existence, each accompanied by an excellent portrait of the subject. From the very beginning these industrious doctors began to explore and make practical use of all aspects of scientific knowledge that might help to lighten the heavy burden of those afflicted with obscure nervous complaints, and then to effect a cure in those difficult cases that before the advent of anæsthesia and the antiseptic system of surgery were beyond all human aid.

WHO ACTION IN THE CONGO.

AT a recent meeting of the Executive Board of the World Health Organization, Dr. M. G. Candau, Director-General of the Organization, reported that in July, in answer to a request of the Security Council of the United Nations, WHO agreed to assist the United Nations crash operation in the Congo, and to take care of the most important health needs following the complete break in its health services that occurred when independence came. The immediate objective was to provide minimum medical and preventive health service, and within a week 28 WHO staff members were sent to the Congo, while 28 medical teams provided by 25 national Red Cross Societies answered the joint appeal of the League of Red Cross Societies and the International Committee of the Red Cross made on the request of WHO. Some countries offered bilateral help also, so that soon a series of hospitals were able to start functioning again in the interior of the country as well as in the big cities.

Dr. Candau told that Board that when he first visited the Congo at the end of July he expected that within a few weeks the situation would be clarified. However, after three months the same uncertainties remained, and the way ahead was still by no means clear. It seemed to him that the 1959 situation could not be regained in less than 12 to 15 years, since there were at present no Congolese doctors. Only two were expected to graduate from the Lovanium University in 1961, and even by 1965 there could not be more than 19 graduates. From the beginning the World Health Organization had given full attention to the long-term problem of training enough Congolese doctors to take care of their own country. The University of Lovanium had been asked to enlarge its medical school and accept 30 to 40 students a year instead of 4 or 5. WHO was willing to assist by providing 9 professors for the medical school and 4 for the nursing school.

In the meantime minimum health services were being maintained, and an initial group of 130 health personnel, doctors, sanitary engineers, laboratory technicians, biologists, etc. would be engaged by WHO to work for the Congolese Government. Those temporary engagements would soon be increased to between four and five hundred. The Red Cross had also been asked to increase the length of stay of teams in the country from the initial three to six months and longer, if possible. Dr. Candau pointed out that the success of the efforts being made would depend on the political stability of the country; if that could be assured, there were no big health problems that could not be solved. The Organization had also offered fellowships to about 60 of the 138 medical assistants (*assistants médicaux*) trained under the Belgian system, in order to enable them to take their M.D. degrees, and the French Government had offered to cooperate in completing their training. Medical schools in Lyons, Bordeaux, Rennes, Nantes and Montpellier had each accepted 10 to 13 of them. WHO also had given seven fellowships to young Congolese with suitable educational qualifications who were to follow the regular medical courses in Geneva or in Lyons.

In the ensuing discussion, the members of the Board were unanimous in their appreciation of the action taken by the Organization in the Congo. Dr. Adjei Schandorf felt that Dr. Candau's statement was the best report that he had heard on the situation in the Congo. Nevertheless, he felt that the effort would be of no avail until the problem as a whole was solved and the only legal Government of the Congo was recognized. Professor Eugene Aujaleu expressed gratification at the international cooperation and solidarity that had been demonstrated in the Congo emergency. He praised the speed and efficiency with which the Director-General and his staff had acted, both in the emergency and in trying to meet future needs. Dr. Valery Butrov supported previous speakers on the question, but deplored the fact that the real health situation was much less satisfactory than it had been represented to be before independence. He felt that the WHO Regional Office for Africa could not have been given the facts and expressed his opinion that there should be a more equitable geographical distribution of staff in that office. At present, he said, health questions in Africa were being decided upon by people from outside. He stated that Friendship University of Moscow was ready to receive students, particularly in the medical faculty, and that other countries certainly would also respond to an appeal, naming Rumania and Poland in particular.

SCIENCE AT THE WICKET.

WHY do cricket pitches wear, lose their grass, and eventually crumble? According to C.S.I.R.O. scientists, J. R. Harris and R. D. Bond, these commonplace troubles are usually due to accumulation of salt in the turf. Last summer they surveyed 23 turf wickets in the Adelaide metropolitan area, and found that in 21 of them the salt content had risen to an undesirably high level. The source of the salt is the water supply. Adelaide tap water, and the tap water of some other cities, is somewhat salty. Normal watering in Adelaide adds at least 10 pounds of salt each week to a pitch. Much of this salt is retained in the heavy black clays of which wickets are made.

Harris and Bond, who are on the staff of the C.S.I.R.O. Division of Soils in Adelaide, have published a report which tells groundsmen how to diagnose the presence of too much salt and how to remedy the trouble. One of their recommendations is that bare patches of soil on the wicket should be covered with plastic sheeting to keep them moist and to encourage the growth of grass. They also suggest an improved method of laying new wickets suitable for Australian conditions.

The troubles found in the Adelaide wickets are encountered all over the world, and copies of the report have been sought by overseas bodies, including the South African Cricket Association. For the scientists the project has been a labour of love. Harris, a well-known cricket administrator, is Secretary of the Cricket Union of South Australia. He and Bond play for the Waite Research Institute Cricket Club, and share the record for its highest partnership for any wicket of 248 runs.

Abstracts from Medical Literature.

MEDICINE.

Listeria Meningitis.

H. J. WELSHIMER AND N. C. WINGLEWISH (*J. Amer. med. Ass.*, November 7, 1959) state that recent evidence indicates that *Listeria monocytogenes*, which causes a serious meningitis in persons of all ages, or a fatal granulomatosis in the fœtus or newborn infant, is widespread but unrecognized. It is being isolated with increasing frequency, and persons who have recognized one case of listeriosis often then come across other cases. The authors give details of seven cases of listeria meningitis which they have observed in Richmond, Virginia. The organism may be seen in direct smears of cerebro-spinal fluid, and they suggest that many cases of so-called sulpha-resistant and penicillin-resistant pneumococcal meningitis, diagnosed on smears only, are in reality cases of listeria meningitis. The results of blood cultures were negative in all but one of the authors' cases. Two of the patients were neonates who died soon after admission to hospital; the remainder all responded promptly after appropriate chemotherapy and made a good recovery. In discussing the epidemiology of the condition, the authors consider the possibility of transmission by ticks or insects in certain cases. The bacteriology of *L. monocytogenes* is discussed, and it is suggested that it is often overlooked because it is mistaken for a diphtheroid skin contaminant. Furthermore, although the organism is easily grown, in some instances it may be difficult to isolate from infected material.

Chloramphenicol and Blood Dyscrasias.

THE COUNCIL ON DRUGS OF THE AMERICAN MEDICAL ASSOCIATION (*J. Amer. med. Ass.*, April 30, 1960) has authorized a report on blood dyscrasias associated with chloramphenicol therapy by the Subcommittee on Blood Dyscrasias of the Committee on Research. It is stated that an increase in the receipt by the Registry on Blood Dyscrasias of reports in which chloramphenicol is associated with the development of a blood dyscrasia makes it important to review once more the toxic effects of this drug on the blood-forming organs of sensitive persons. Between January, 1953, and January, 1960, the Registry on Blood Dyscrasias had received 223 reports of pancytopenia, of which 91 were of cases in which chloramphenicol had been administered; in 34 of these chloramphenicol was the only drug given. Another survey is quoted in which 31 cases of aplastic anæmia associated with chloramphenicol administration were reported between late 1955 and early 1957. Of these 31 patients, 23 had died, but only 8 cases had been reported to the Registry. The Subcommittee on Blood Dyscrasias recognizes that chloramphenicol is a valuable and important antibiotic, but they note that, in spite of warnings by the manufacturer against indiscriminate use of the drug, reports received by the Registry reveal that it had been used in many minor and inappropriate conditions such as the common cold, asthma, undiagnosed low-grade fever, and even gout and iron deficiency anæmia. The subcommittee is of the opinion that there is no longer any reasonable doubt that chloramphenicol may cause aplastic anæmia. Periodic blood counts may be of some help, but they cannot be relied upon to detect signs of marrow toxicity sufficiently early. Therefore it is urged that chloramphenicol should not be used prophylactically, in trivial infections, or in infections in which other less dangerous antibiotics may be used effectively.

Anti-Hypertensive Drugs.

G. A. PERERA (*J. Amer. med. Ass.*, May 7, 1960) discusses the use of anti-hypertensive drugs. He selected 29 patients and their matched controls for study. All patients had an established diastolic hypertension. Patients with an accelerated hypertension, secondary hypertension, diabetes, endocrine disorders or heart disease were excluded. Sixteen of the patients were male. No anti-hypertensive drugs were given to one-half of the patients, but they were given sedatives, analgesics, digitalis and diuretics as needed. Within the subsequent seven-year period 16 patients in each group died, and no significant difference was found between the two groups. The age at the start of treatment was between 41 and 52 years. Every patient had at least one recorded standing diastolic pressure of 120 mg. of mercury or higher. No complications of hypertension were present in any of the patients, such as angina pectoris, myocardial infarction, congestive failure, fundus changes or cerebro-vascular lesion. They were plain straight-out hypertensives. Most of the deaths in both groups were ascribable to atherosclerotic complications. The author points out that both the patients treated with anti-hypertensive drugs and the control group had a high initial diastolic pressure, but that life was not prolonged in those treated with anti-hypertensive drugs, although the blood pressure was kept down to 160/104 (standing) by anti-hypertensive drugs of various kinds throughout.

Irritable Colon.

E. W. HEFFERNON *et alii* (*J. Amer. med. Ass.*, May 7, 1960) discuss irritable colon and gall-bladder disease. Three hundred patients were reviewed in whom gall-bladder disease was found at operation or at autopsy. The main symptom was pain in the right shoulder, or true biliary colic. One hundred and forty patients had multiple gastro-intestinal symptoms characteristic of irritable colon. This is an extremely common disorder in which there is spasm of the colon, variable in severity, extent and situation. Removal of a diseased gall-bladder does not always cure the patient's symptoms, and it is often necessary to treat the patient for an irritable colon. The symptoms of this condition are abdominal pain, diarrhœa or constipation, belching and nausea. The results of clinical and X-ray examination are often negative, but spasm may be seen radiologically. The authors advise a bland diet with no fats, fried foods, roughage or spicy food. Laxatives and enemas are avoided. Fruit and orange juice are advised for constipation, with antispasmodics phenobarbitone (one-quarter to one-half grain) before meals and at bedtime. The patients are often, but not always, relieved.

Morphological Aspects of Renal Glycosuria.

P. LEONARDI, A. RUOL AND R. MUNARI (*Amer. J. med. Sci.*, June, 1960) discuss the morphological aspects of renal glycosuria and report on five patients with this condition. The renal functions of these patients were found normal, and no structural alterations were found from a renal biopsy in three of the patients. Alkaline phosphatase activity of the proximal tubules was normal. No alterations in the fine structures of the proximal tubular cells which would be considered typical of renal glycosuria could be detected with the electron microscope.

Refractory Ascites in Cirrhosis of the Liver.

A. J. REDEKER, O. T. KUZMA AND T. B. REYNOLDS (*A.M.A. Arch. intern. Med.*, April, 1960) report on an effective treatment of refractory ascites in cirrhosis of the liver. The combined administration of chlorothiazide and 6-methyl prednisolone (6-MP), induced a marked sodium diuresis in 15 of 18 patients with alcoholic cirrhosis and resistant ascites. Neither chlorothiazide nor 6-MP exerted a natriuretic effect when administered alone. Urinary sodium excretion averaged 3 mEq. per 24 hours during chlorothiazide administration alone, and increased to an average of 56 mEq. per 24 hours when both compounds were administered concurrently. No complications were observed in this study from the prolonged administration to cirrhotic patients of either chlorothiazide or 6-MP.

Antimicrobial-Steroid Treatment of Active Pulmonary Tuberculosis.

H. MARCUS AND P. CHRISTOPOULOS (*A.M.A. Arch. intern. Med.*, April, 1960) discuss the antimicrobial-steroid treatment of active pulmonary tuberculosis as a routine measure. Thirty patients with various forms of pulmonary tuberculosis were treated with a combination of steroid hormone and antimicrobial therapy. No patient showed clinical or radiographic deterioration on this treatment. All patients showed immediate symptomatic improvement. Clearing observed in serial chest films was prompt, so that at the end of two to four weeks' observation only six patients showed less than moderate improvement. Twenty-four patients showed moderate, marked, or very marked improvement at two to four weeks. At the end of three months all but two patients showed either moderate, marked or very marked clearing. This group was compared with a group of 30 patients treated identically except for omission of steroid hormone. The comparison demonstrated the advantages of combined steroid and antimicrobial therapy. Complications were few and mild. On the basis of this experience the authors feel justified in stating that

combined steroid and antimicrobial therapy is, at present, the best form of treatment for all patients with active pulmonary tuberculosis.

The Diagnosis and Treatment of Renal Hypertension.

E. R. YENDT *et alii* (*Amer. J. Med.*, February, 1960) review the literature on the subject of renal hypertension and recount their experience with 20 patients subjected either to nephrectomy or to renal artery repair for the relief of renal hypertension. The authors suspect any patient who has hypertension which is severe or is accompanied by renal, cardiac or neurological sequelæ. In particular, they consider that the following groups of patients should be subjected to special investigations: (i) those with hypertension of recent onset, especially if progressive; (ii) elderly patients with sudden appearance of malignant hypertension; (iii) young patients with no obvious cause for their hypertension; (iv) any patient with sudden deterioration; (v) patients with a history of recent renal vascular accident. The authors rely mainly on aortography and differential studies of renal function. Renal ischæmia is suggested by a 50% reduction in urine flow in the affected side and a 15% reduction in sodium concentration. The inadequacy of an intravenous pyelogram as a screening test is stressed; it was quite normal in six of the 20 patients. The results of surgical treatment and a short follow up of the patients are presented.

Effect of Thoraco-Lumbar Sympathectomy on the Course of Primary Hypertension.

K. A. EVELYN *et alii* (*Amer. J. Med.*, February, 1960) report a collaborative large-scale, long-term study of the effects of thoraco-lumbar sympathectomy on the clinical course of essential hypertension. The results of a ten-year follow up of 100 surgically treated patients are compared with 100 matched control subjects. The data are in general agreement with previous reports but are more complete and in some respects disillusioning. Surgical intervention reduced hypertension, cleared papilloedema and to some extent retarded renal deterioration. There was no significant difference between surgically and medically treated patients in the incidence of heart failure, myocardial infarction, cerebral vascular accidents and mean time of survival. The authors state that in their opinion thoraco-lumbar sympathectomy still has a place in the management of essential hypertension, but conclude that the over-all effects of the operation on morbidity and mortality were on the whole disappointing.

Effects of Atrial Fibrillation in Patients with Mitral Stenosis.

A. SELZER (*Amer. Heart J.*, April, 1960) states that atrial fibrillation is known to occur in approximately 40% of cases of mitral stenosis and is generally regarded as an undesirable complication, even if adequately controlled by digitalis. Atrial fibrillation enhances the formation of mural thrombi and causes undesirable hæmodynamic changes with lowering of cardiac output, increase of pulmonary vascular resistance and higher left atrial and pulmonary artery pressures. The author thought that this might be partly due to the fact that atrial fibrillation occurs in more advanced cases and in older patients with mitral stenosis, and therefore set out to study 67 patients with mitral stenosis in an attempt to evaluate atrial fibrillation as the only variable factor. Three patients were studied before and after the onset of fibrillation, and in addition 15 pairs of patients matched in all respects except cardiac rhythm were compared. The level of pulmonary artery pressures and pulmonary vascular depression showed no significant difference. But the cardiac output was found to be consistently lower in patients with atrial fibrillation, the mean difference being approximately 20%. The author concludes that atrial fibrillation even under optimal digitalis control tends to lower significantly the cardiac output in patients with mitral stenosis and thereby accentuates clinical disability.

Status Anginosus.

C. PAPP AND K. SHIRLEY SMITH (*Brit. Heart J.*, April, 1960) define status anginosus as a condition characterized by periods of frequently recurring anginal pain at rest, alleviated by trinitrin briefly or not at all, and indistinguishable from the pain of cardiac infarction or from its prodromal manifestations, but without electrocardiographic and laboratory evidence of classical infarction. In a series of 20 patients the syndrome developed insidiously from angina of effort and gradually increased in severity into a state in which decubital angina became the main feature. Periods of frequently recurring night attacks alternated with periods of relative freedom. Cardiac infarction developed within weeks or months in half the patients. The electrocardiographic features were those of subendocardial ischæmia with sloping or square *S-T* depression. Less common features were changing *T* waves and *S-T* segment elevation resembling the acute injury pattern. Necropsy studies in three cases showed subendocardial infarction caused by severe atherosclerotic narrowing of the main coronary arteries. Death may be sudden during an attack of pain or gradual with rapidly progressing left ventricular failure. Treatment is essentially symptomatic and has not been found materially to alter the course of the disease.

Myocardial Injury from Therapeutic Irradiation.

M. CATTERALL AND W. EVANS (*Brit. Heart J.*, April, 1960) review the cases of 26 patients who received radiation treatment to the chest during treatment of malignant disease. Cardiac changes were only observed in those in whom radiation was directed towards the left side of the chest and the heart lay in the direct path of the therapeutic rays. This occurs most commonly in patients undergoing radiotherapy after mastectomy for carcinoma of the left breast. Out of 12 such patients electrocardiographic changes were discovered in nine; these consisted of *T* wave inversion or flattening suggesting injury to the anterior wall of the left ventricle. These changes occurred within four months of conclusion of radiotherapy and disappeared within nine months in all the surviving patients. The authors stress that the myocardial changes resolve entirely without scarring and are therefore of an innocent nature. The importance of the findings lies in the recognition of the cause of the electrocardiographic changes and in avoiding misinterpretation of them as being due to myocardial infarction.

Prednisolone Maintenance Therapy in Chronic Pulmonary Heart Disease.

J. N. MICKERSON (*Brit. Heart J.*, April, 1960) states that while the effectiveness of cortisone in the treatment of status asthmaticus has been established, the value of its continued administration in chronic asthma is disputed. The benefit of steroid maintenance therapy has to be weighed against the obvious disadvantages and dangers attending their continued administration. The author describes a small series of 20 patients with bronchial asthma, three having chronic pulmonary heart disease, who were treated with prednisolone for a period of nine months. Daily maintenance dose varied from 7·5 to 12·5 mg. Coexistent heart failure was relieved and all patients were maintained free from symptoms and unrestricted in their activities. The author maintains that long-term steroid therapy is justified in patients with bronchial asthma and chronic cor pulmonale. The presence of pulmonary *T* waves in the electrocardiogram is considered as an indication for maintenance therapy.

The Electrocardiogram in Sub-Arachnoid Hæmorrhage.

S. SHUSTER (*Brit. Heart J.*, June, 1960) confirms that abnormal electrocardiograms may be found in patients with intracranial hæmorrhage. The most striking changes include *T* wave inversions and displacement of the *S-T* segment resembling myocardial infarction. The explanation of these abnormalities is not clear, but it seems that blood in the subarachnoid space is a more important factor than damage to the brain. In one patient the author was able partially to correct the abnormal electrocardiographic changes by the administration of atropine. The author stresses the general similarity of these electrocardiograms with changes produced by vagal stimulation and thus suggests the possible explanation for his findings.

Chronic Atrial Fibrillation Unrelated to Organic Heart Disease.

E. J. HOWARD (*Amer. Heart J.*, March, 1960) reports a follow up study of five patients with chronic atrial fibrillation without obvious organic heart disease. In the period of observation, which extended up to 14 years, four of the patients required permanent digitalis therapy; one of these had been in frank congestive heart failure. Each of the five patients appeared to have a personality defect confirmed by psychiatric evaluation. The author speculates as to the possible ætiology of the symptoms.

Brush Up Your Medicine.

ANTIBIOTIC THERAPY: CAUSES OF THERAPEUTIC FAILURE.[1]

The Role of the Laboratory in Antibiotic Therapy.

IN summary the role of the laboratory in antibiotic therapy is as follows.

1. Isolation and identification of microorganisms.

2. Determination of sensitivity in the case of a staphylococcus or a Gram-negative organism. Sensitivity tests are unnecessary for Group A hæmolytic streptococci and pneumococci.

3. Determination of the concentration of antibiotic in the blood, urine or other body fluids.

4. Determination, when necessary, of the precise optimum dosage of antibiotic.

5. Recognition of early renal or hæmatological toxicity.

6. Determination of proper control of the infection: assessing progress, detecting relapses, recognizing biological complications, checking when infection is completely eradicated.

7. Determination of the staphylococcal phage-type when necessary and particularly from the aspect of epidemiological information.

8. Determination of the sensitivity of organisms in the following mandatory situations: (*a*) if the isolated organism is known to be frequently resistant to particular antibiotics, as are *Staphylococcus, Enterococcus, Pseudomonas* and *Proteus*; (*b*) in severe infections, because of localization, extension or the age of the patient; (*c*) in infections that prove resistant to therapy; (*d*) in chronic infections; (*e*) in recurrent infections.

Causes of Therapeutic Failure.

At times antibiotics are undoubtedly given indiscriminately and without any particularly clear or logical reason in the minds of some doctors prescribing them. Nevertheless, however prompt we may be in our criticism of antibiotic usage, it should be remembered that there are still some important aspects of the subject concerning which it is not yet possible to be dogmatic. One often hears statements that laboratory culture and sensitivity reports do not always tie in with clinical response to the antibiotic recommended. There are several reasons for this; some are avoidable, but all should be borne in mind.

A. Causes Mainly Involving the Organism.

1. The organism causing the infection was not properly identified.

2. The presence of a mixed infection was not recognized.

3. A resistant strain of a species that is known usually to be sensitive to the antibiotic used was not recognized as the cause of the infection.

4. Bacterial resistance developed during the course of treatment. Antibiotic resistant variants almost always arise as a result of spontaneous mutations.

5. "Superinfection" developed during the course of treatment.

6. Resistance of an organism to a particular antibiotic, reported by the laboratory, does not hinder natural recovery from an infection which would, in any case, resolve without chemotherapy.

7. Sensitivity of a culture tested in the laboratory (*in vitro*) may differ from that of the same organism in the patient's tissues (*in vivo*).

B. Causes Mainly Involving the Antibiotic.

1. An effective antibiotic was not selected.

2. Inadequate dosage was used.

3. Length of treatment was inadequate.

4. An effective blood level of the antibiotic was not maintained in spite of an adequate amount of total daily dosage, as a result of, for example, interference with absorption or wide spacing of single doses.

5. Infection was localized in an area that cannot readily be reached by the antibiotic in an effective concentration, e.g., in a walled-off abscess, in dead tissue or in pus.

6. Special conditions may be needed for an antibiotic to act: (i) streptomycin is about 50 times more effective in an alkaline than in an acid urine; (ii) penicillin and chlortetracycline are more effective in an acid medium.

7. The antibiotic may be diluted beyond the point of effectiveness, for instance, in urinary infections, when the patient is traditionally urged to take copious fluids.

C. Associated Factors.

1. If infection is secondary to obstruction or stasis in the urinary tract or elsewhere, the effect of any drug therapy will be only temporary unless the underlying condition can also be relieved.

2. It is seldom realized that, although the in-vitro bacteriostatic and bactericidal concentrations of antibiotics for a bacterial species can be ascertained without much difficulty, this information is not used for deciding the dosage. Reliance is placed on "standard dosage schedules" of antibiotics. Closer liaison between clinician and laboratory is most desirable, especially in serious and difficult cases, so that a dosage of the correct antibiotic, adjusted to the individual patient's clinical requirements, can be administered.

3. Results of in-vitro tests depend, especially with *Staphylococcus aureus*, on the size of the inoculum and on the strength of the antibiotic used in the sensitivity test. Little progress has been made towards standardization of laboratory techniques in this regard, except by the indirect contribution of the manufacturers of standardized disks and tablets.

4. In urinary infections it is advisable to examine the urine at frequent intervals during therapy, so that the antibiotic may be changed if necessary.

5. A microorganism within living tissue and accessible to an antibiotic is likely to be more sensitive than in any in-vitro test, by reason of the fact that in these tests the organisms are usually more numerous per unit volume than is ever likely to be the case in tissue.

6. *In vitro* the organism may also be temporarily in a resting phase, in which state it is more resistant to inhibition.

7. The natural antibacterial mechanism of the host increases the activity of the drug, which varies in degree from patient to patient.

8. Clinicians involved in the treatment of tuberculosis have generally had a closer liaison with the laboratory than those treating other infections, and many attach great significance to the results of in-vitro sensitivity tests.

9. It cannot be emphasized too strongly that staphylococcal disease is an infectious disease and, especially when one is dealing with recurrent furuncles, pustules and other chronic lesions involving the skin and subcutaneous tissues, adequate preventive measures are of equal importance to actual therapy. The focus of infection should be sought. Nasal, axillary or ano-genital swabs may be required. Swabs may be required from other members of the family. The skin may be cleansed with a soap containing G11. Hexachlorophene may be rubbed gently into the skin. The personal clothing and bed clothing should be remembered as a source of infection. There is always the possibility of an epidemic strain, originating in hospital, being brought home by a member of the family recently hospitalized. These measures are of particular importance when more than one member of a family is suffering from recurring staphylococcal infection.

Further Reading.

Further information may be obtained from the following:

Leading article, "Fifteen Years of Antibiotics", *Lancet*, February 20, 1960.

GOULD, J. C., "The Laboratory Control of Antibiotic Therapy", *Brit. med. Bull.*, January, 1960.

HUSSAR, A. E., and HOLLEY, H. L., "Antibiotics and Antibiotic Therapy", 1954, Macmillan Company, New York.

ALEX JOHNSON,
Canberra.

[1] No. 10 of a series of synopses prepared by Dr. Alex Johnson of Canberra in collaboration with the Australian College of General Practitioners. Each synopsis has been submitted for approval to a leading member of the College, to a professor of pharmacology and to a specialist in the field concerned.

Points of View.

"FOR WHOM THE BELL TOLLS."

THE publication of Sir Arthur Porritt's presidential address given at the opening of the 128th annual meeting of the British Medical Association at Torquay in June of this year[1] is a notable event; it may prove too late to influence the administration of the *National Health Act* in Britain but could, or perhaps should, mark a turning point in our ways of thinking on such matters in Australia.

A presidential expression of medical policy must always be worthy of deep reflection both by the speaker and by the wider audience.

Given, as it was, in the presence of Prince Philip and seeming, as its wording appears to be, addressed to him, it might be interpreted as an appeal direct to the Sovereign and over the heads of Parliament and the Civil Service—a last and despairing plea for freedom.

He says that "the National Health Service should be administered by an independent corporation . . . this implies the disbursement and application of public moneys by an independent body without the intervention of departmental machinery, and without the need for a minister to be answerable to Parliament for the day-to-day conduct of the service"; this, he says, would lift medicine out of the realm of party politics—"an influence which has bedevilled the National Health Service from before its inception". Such a measure means no more and no less than that a medical service should be organized, administered and policed by the profession whose responsibility it then becomes to make it work. Such a towering vision of the future sends our thoughts back to the past, for, as it has been well said, "History repeats itself".

It is just 10 years since Scott Williamson, the founder of the Peckham Health Centre, died and left behind a few scattered literary remains of quite uneven merit, among them a slim volume with the title "Physician Heal Thyself".

Among much that is irrelevant and visionary he propounded for the English profession as far back as 1944 a plan for a National Health Service precisely in the form in which Sir Arthur Porritt would have it today.

Indeed, one might suspect from some of his phrasing that Sir Arthur had himself been undertaking some research into "the dark backward and abysm of time" and there found the prophet who was without honour.

What Scott Williamson had to say on 130 pages of now yellow and fading "war economy" paper can be crowded into one drawing (Figure I).

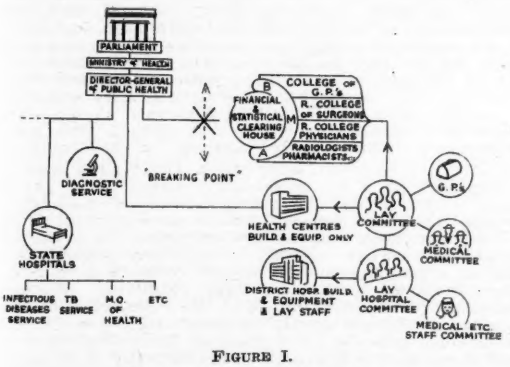

FIGURE I.
The Scott Williamson Plan.

His "Financial and Statistical Clearing House" has now become the "independent corporation" of Sir Arthur Porritt.

With Scott Williamson the government provides buildings, plant, equipment and ancillary personnel; the various branches of the profession govern themselves and monthly submit a bill for services rendered through their own "clearing house" to the Treasury.

The system has something of the mediæval guild in it and as much freedom as any organized service can ever confer on the individual.

At the least it must be conceded that a profession working within this system would have greater mastery of its fate, of its standards of service and of ethics than any other yet propounded.

Melbourne. H. SHANNON.

[1] *Brit. med. J.*, 1960, 1:1907 (June 25).

Out of the Past.

THE CLOSURE OF WOUNDS.

[This simple but fundamental introductory paragraph occurs in the chapter on "The Methods of Closing Wounds" in a remarkable work, "Plastic Surgery", by William Moore, Surgeon to Out-Patients, Melbourne Hospital. The book, published in 1899, consists of reprints from the *Intercolonial Medical Journal of Australasia*, and contains chapters on the closure of wounds by forming flaps, the Tagliacotian operation, Wolfe and Thiersch grafts and on the plastic surgery of the nose, jaw, hypospadias and imperforate anus.]

BEFORE the days of anæsthetics sutures were very little employed for closing wounds. The pain that the patient had to bear during the necessary part of the operation was quite enough, without adding the numerous punctures of the needle required in the application of stitches. Hence, wounds were closed with adhesive plaster. After the discovery of anæsthesia, sutures were very much more commonly employed, but then suppuration was very frequent, and so the sutures had to be cut and the wound allowed to gape. Hence, it came about that some surgeons considered it wiser to neglect bringing the edges together at all, and treated their wounds by the "open method". But with the advent of Listerism healing by first intention became much more common, and it was now well worth while to take some pains to accurately close practically all wounds, due provision being made in certain cases for drainage; and recently, the provision for drainage is rarely made. The absolutely accurate closure of operation wounds is probably a matter of greater importance than is generally supposed. The more accurately the edges of the wound, and especially the skin edges, are brought into apposition, the more quickly will union take place. It is well known that it is almost impossible to render the skin perfectly free from germs. If the edges of the wound do not come accurately together, and if union is thus delayed, there is a danger that germs will find their way into the unhealed part of the wound, and so an infective suppurative process may be set up.

British Medical Association.

NEW SOUTH BRANCH: SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on Decemebr 10, 1959, at the Robert H. Todd Assembly Hall, British Medical Association House, 135 Macquarie Street, Sydney. Dr. M. S. ALEXANDER the President, in the chair.

Eczema.

DR. M. T. HAVYATT read a paper on eczema. This paper has not been made available for publication.

DR. P. C. P. WAUGH read a paper entitled "Eczema". He said that the first problem confronting anyone concerned with "eczema" was the vast confusion which seemed to exist regarding terminology. For many years the name appeared to have been a veritable dermatologist's dustbin. He had it on good authority that the derivation was from the Greek and simply meant "a thing that has boiled". That descriptive type of nomenclature, without any relationship to ætiology or actual pathology, was surely fit for discard. As a descriptive adjective the word had some definite function, and he would prefer the term "eczematous dermatitis", with necessary subdivisions. In that complicated hotch-potch, he intended to refer only to those conditions of which he had some little personal experience. They included atopic (or allergic) dermatitis and contact dermatitis.

Atopic Dermatitis.

Dr. Waugh went on to say that in most cases of atopic dermatitis of which he had any personal knowledge, it presented in childhood as the typical flexural type; it appeared as early as a few weeks of age, or waited until the time of weaning at five or six months. Those forms which persisted beyond the child's second birthday always presented the major problem. Fortunately, many had disappeared by that milestone, no matter what form of therapy was employed. In the infant and childhood type there appeared to be a definite increased instability of the skin, the respiratory tract and the temperament. There was a deal of evidence to suggest that allergy to foreign protein was the mechanism by which that skin irritability arose. That evidence included (i) associated, or alternating, proven allergic manifestations (hay-fever, asthma, diarrhœa), (ii) frequently a strong family history of allergy, (iii) eosinophilia, (iv) positive results to skin tests, (v) exacerbation on challenge with suspected allergens ingested, inhaled and exhibited by contact.

Dr. Waugh went on to discuss briefly skin tests in atopic dermatitis. He said that it was relatively easy to demonstrate immediate weal and flare reactions in children. In the under three years age group, the order of frequency of such positive reactions seemed to follow a fairly constant pattern of allergens, namely (i) egg white, (ii) cow's milk and (iii) wheat. In older children, particularly at about the magical age of seven years, the order of frequency changed, and it was more usual to find inhalants heading the frequency lists: (i) dusts and moulds, (ii) wool, (iii) pollens, with the foods wheat, milk and chocolate well down the list. In even later years the previous "positives" became more and more difficult to demonstrate, and the accent appeared to fall on the bacterial products, particularly staphylococcal toxin. All that was fairly reasonable if one remembered that the first foreign proteins with which the very young came into contact were foods, to be followed later by a wide variety of inhaled substances. To those foods many children became sensitized, and produced positive responses to skin tests. That sensitization might never reach the level necessary to produce clinical manifestations other than a positive skin response, or, if the sensitization was a little more intense, it might show itself as colic and diarrhœa or eczematous skin eruptions. In the under two years group, elimination diets were often of startling value. That was illustrated by the story of baby M., whose mother was severely asthmatic, and who had two sisters with eczema. He had infantile eczema from the age of six weeks, when he was weaned. It persisted until the age of 10 months, when he showed a very strongly positive reaction to cow's milk and egg white. The administration of only hard-boiled egg-yolk, and the acquisition of a goat, were followed by complete and lasting clearing of the skin in three weeks, with no other treatment. Dr. Waugh said that as the child grew older, the clinical manifestations of food hypersensitivity were gradually overcome, either by avoidance of the foods or by natural desensitization. The foods no longer produced eczematous dermatitis, although the skin tests still produced positive results. That was the explanation of the fact that elimination of various foodstuffs—positive skin reactions being used as the indication—was frequently useless in the treatment of children over the age of two years. By the age of five or six years, new inhalant allergens took over by reason of a wider field of exposure to foreign protein. They were at first perennial dusts and moulds, or less often, seasonal pollens. As sensitization developed those inhalants might cause a flare-up of the old eczematous dermatitis if there was minimal exposure, or a manifestation of respiratory allergy if the exposure was more intense and was continued. The food allergens were supplanted by inhalant allergens, and the eczematous dermatitis was replaced by hay-fever or asthma. There might be a transition period when both eczema and hay-fever existed together and both flared up together, or when one alternated with the other, largely dependent upon whether the exposure was mainly to food allergen or to inhalant allergen. In still older age periods it seemed that adult eczematous dermatitis had a place very close to asthma and frequently management along similar lines would materially assist in controlling the condition.

Dr. Waugh then discussed the question of when good results could be expected to follow "allergic treatment". He said that in the first place, the result was good when there was a clear history of a purely seasonal occurrence of the rash or seasonal exacerbation of a chronic rash. That particularly applied when the eczematous dermatitis was associated with seasonal hay fever or asthma. Adequate control of the respiratory allergy usually led to adequate control of the eczematous dermatitis. In the second place, the result was good when there was associated perennial hay-fever or asthma caused by a dust or mould, and when exacerbation of the rash could be provoked by challenge. That challenge might be in the nature of a direct exposure. It was a frequent practice of his deliberately to provoke asthma by direct exposure if he suspected that dusts were a cause, and that frequently led to a two or three days' exacerbation of any coexistent dermatitis on the exposed portion of the body. It was frequently possible to elicit the required information from the history without resorting to artificial exposure, as was shown in the cause of a housewife, aged 34 years, who had classical house-dust asthma and itchy eczematous dermatitis of the face and neck. Spring cleaning or return to a shut-up home after a holiday usually led to a flare-up of both conditions. The use of a wet mask over the nose and mouth materially relieved the asthma, but not the dermatitis. Eventually hyposensitization was followed by the control of both conditions. Dr. Waugh said that the challenge might take the form of an overdose inadvertently given to a patient who was undergoing a course of hyposensitization for respiratory allergy. Ordinarily, a general reaction of sneeze-and-wheeze so produced in a clean-skinned individual was accompanied by skin itching with or without urticaria; but in a patient with present or past eczematous dermatitis there was frequently an acute flare-up of the skin condition after a few hours, which lasted for two or three days. The clinic patient appeared quite prepared to put up with an occasional general respiratory reaction during treatment, but was usually bitterly resentful of any rash that was stirred up. Dr. Waugh stressed the fact that treatment along allergic lines did not necessarily imply any injection; much better results were often obtained by avoidance of contact, or by minimizing contact by such methods as the adequate treatment of dust-laden bedding and the like.

Dr. Waugh next posed the question of when bad results could be expected by reliance on skin tests. He said that bad results would follow such reliance in the two to five years age groups, when food allergies had been overcome and inhalant allergies were not fully developed. Elimination of food at that stage was most often useless. Bad results would also follow when the skin responses to testing were minimal, and in most instances when the previously mentioned positive criteria did not exist—in other words, when there were no seasonal exacerbations, no associated respiratory allergy and no positive response to challenge. That led to a consideration of the inadequacies of the present methods of skin testing, whether by scratch, patch or intradermal injection. There were two fairly certain pitfalls. (i) The skin reactions might be considerably delayed (and consequently missed) beyond the usually accepted time limits of 20 minutes for scratch and injection, and 48 hours for patch tests. He believed that when eczematous dermatitis was under investigation, the minimal period of observation for the former should be 24 hours and for the latter four days. It seemed likely that all sensitization acted by way of a sweat-retention mechanism, and because of the enormous reserves of sweating ability, the results might not be obvious for days. He himself knew of no way of spotting early sweat retention. (ii) Normal skin might not react to testing, whereas abnormal skin might. If possible, some tests should be performed on the affected areas of abnormal skin. The best method was just to smear a little of the suspected substance on the affected part.

Turning to bacterial sensitization Dr. Waugh said that it was probably a purely secondary phenomenon, and was almost certainly not the primary cause of disability. A ploughed-up or "boiled out" skin became readily infected, and the commonest skin response on testing was to staphylococcal toxin. That bacterial sensitization probably acted only as a precipitating mechanism in line with a host of other irritants, such as humid conditions, scratching, mechanical irritations and the like. Nevertheless occasionally one did see gratifying results from desensitization. An example was the case of a now attractive blonde girl, aged 16 years. She had suffered the indignity of eczematous dermatitis from infancy, unresponsive to everything from coal-tar to steroids. Eight week's treatment with staphylococcal toxoid, and nothing else, was followed by most dramatic improvement. Because someone was bound to query it, Dr. Waugh mentioned that the improvement antedated the onset of her menstrual periods by 18 months.

Contact Dermatitis.

Dr. Waugh then discussed contact dermatitis. He said that there was a well-documentated story of sensitization to (*a*) applied medicaments, (*b*) cosmetics, or (*c*) plants. He had never been convinced that he had been able to

find out by patch testing any more than could readily be elicited by a careful history. There was some help sometimes to be obtained by way of confirming a suspicion; but withdrawal and challenge appeared to be a more reliable way of tackling the problem. It might be a significant fact that a good deal of the trouble from cosmetics appeared to arise from those which contained eosin, a potent cause of photosensitivity and histamine release.

Conclusion.

Dr. Waugh said in conclusion that he did not want to imply that investigation of allergic factors and their subsequent management constituted the be-all and end-all of the treatment of eczematous dermatitis. However, he did suggest that under certain restricted conditions it might constitute a valuable weapon in the management of a prevalent and troublesome disorder.

DR. BERNARD RILEY asked Dr. Havyatt what was the nature of the diffusible substance that caused so much damage.

DR. V. J. MCGOVERN said that he was grateful to Dr. Havyatt for defining the eczema reaction, and he would like to apply some academic findings to Dr. Waugh's clinical experiences. It might be recalled that Professor Kern had likened some members of the human race to rats, in that they seldom developed sensitivities; others he likened to guinea-pigs in being readily sensitized; while the majority were guinea-rats, resembling one type or the other in more or less degree. Therefore, it could be said that all humans were reactors, but some only to slight degree. First, all histamine-release phenomena in the skin were mediated by mast cells and were due to the discharge of mast-cell contents. Simple damage to the epidermis caused the liberation of some substance which reacted with mast cells and elicited the response of redness, œdema and itching. He had been experimenting with photosensitivity, and he had come to the conclusion that in that condition, a component of nucleoprotein, probably a histone, was discharged which then reacted with mast cells and caused the reaction. It was quite likely that contact dermatitis was initiated in that way by direct injury to epithelial cells, and in some cases it might be reinforced by some degree of photosensitivity also. That type of reaction, which required no immunological basis, was atopy.

As for sensitization due to antigen-antibody reactions, it could be shown that the antigen-antibody complex could react with mast cells experimentally. That, therefore, might be the means of eliciting the response of redness, œdema and itching in the sensitive person. In the established eczematous reaction there were lymphocytes and plasma cells around blood vessels in the dermis. It was known that plasma cells manufactured antibodies, and the site of the plasma cells in the skin might be in accordance with Sir Macfarlane Burnet's theory of selective multiplication of clones of antibody-producing cells following antigenic stimulation. It was interesting in that regard that corticoids, which inhibited the multiplication of mesenchymal cells and which prevented depleted mast cells from becoming replete, diminished the eczematous reaction. Furthermore, X rays, which destroyed lymphoid cells, might also have a beneficial clinical effect.

Dr. McGovern said he thought that enough knowledge was being accumulated to permit an attempt to correlate the clinical aspects of sensitivity states with the results of academic experimentation, and by that means workers might begin to understand the underlying mechanisms.

DR. J. C. BELISARIO said that it was a fact, which he had maintained for many years, that all could agree on a morphological concept of "eczema" or "eczematitis" as characterized by pinhead-sized macules, papules, vesicles and weals. It was an ætiological concept which made for all the lack of unanimity among different workers. He had taught students that an easy way to visualize a morphological concept was to imagine a pot of water on a stove. When heat was applied the water became warm, and that might be likened to a noxious substance producing early erythema on the skin. If the heat was removed, the water returned to normal, as did the skin on removal of the noxa. However, if the water was heated further, pinhead-sized bubbles formed before boiling occurred. That was the prototype of the pinhead-sized vesicles of the eczema reaction due to a further degree of stress or irritation produced by the noxa. Further heating of the water caused boiling, with coalescence of the small bubbles to form larger ones, similar to the transformation of eczema vesicles to the bullæ of traumatic dermatitis produced by a still greater stress or irritant. Finally, if sufficient heat was applied to the water in the pot, it evaporated and disappeared, and that corresponded to chemical or thermal destruction of the skin. He had also long maintained that, even as traumatic dermatitis could be produced in anyone by a strong enough irritant, so could allergic contact dermatitis or "eczema" under suitable circumstances in any human being, regardless of any inherent predisposition. The main determining factors were the degree of concentration of the noxa and the duration and number of exposures. An altered capacity to react, whether inherited or acquired, or a constitutional background, or both, were not essential prerequisites for the production of the eczema reaction, even though they could accelerate or accentuate it.

Dr. Belisario went on to say that a number of years previously he was the first, as far as he knew, to draw attention to the degree of difference in erythema reaction between small and large areas of skin following X-radiation which was not accounted for by estimated backscatter. He had referred to it at the time as the "tissue injury factor", and had first noted its existence in 1939. Later he had postulated the existence of a "diffusible substance" to account for the "tissue injury factor". Among other workers who had lately written on this subject, Witten *et alii* in 1957 had further proved the existence of some form of "diffusible substance" by producing skin erythema by the surface application of a polonium plaque. Such a plaque emitted only alpha radiation, which did not completely traverse the epidermis. Consequently, some "diffusible substance" had to be formed to penetrate further and cause dilatation of the dermal blood vessels to produce erythema.

Charpy in 1953, in experiments on guinea-pigs, had produced strongly suggestive experimental evidence that "sensitization eczema" was produced in the following way. The allergen, placed in contact with the skin, traversed it and arrived first at the sensory terminations. It was then transported along the sensory nerves to the cells of the posterior ganglia. Sensitization was established at that moment. The incubation period of contact dermatitis, other things being equal, was proportional to the distance which separated the treated skin from its corresponding posterior ganglion. Also, it seemed impossible to produce "contact eczema" on a skin area whose sensory root had been sectioned and had degenerated. In other words, "sensitization eczema" was a syndrome of bipolar irritation of an allergen in contact with the cutaneous sensory endings, and with a sensitive trophic centre situated upstream. In contact dermatitis, the allergen attacked first the peripheral endings, and was then carried to the posterior ganglia. Sensitivity was thus created, and it extended to the entire skin surface.

Discussing nervous influences, Dr. Belisario said that certain psychological effects might have a neuro-biochemical basis of a normal physiological type. Emotional reactions and exacerbations of skin lesions might so affect the nervous system as to cause physical changes which rendered a person's tissues more susceptible to the allergens that initiated dermatitis. The dermatitis in reverse might increase nervous tension. Psychosomatic factors might influence the skin through nutritional vasomotor and reflex mechanisms; also, the potentiation of some bacterial mycotic, metabolic and allergic dermatoses might be explained on the basis of the chemical mediation of nerve impulses.

Dr. Belisario went on to say that the effects of endocrine dysfunction might be mediated through the autonomic nervous system. They might initiate or potentiate psychosomatic disorders, or determine whether an allergen might cause clinical symptoms at one time and not at others.

Anoxia or changes in oxygen tension, he believed played a greater part in the basic mechanisms of the eczema reaction than was generally realized. His attention had been first drawn to that by Dr. J. B. Scholtz in 1948 in Los Angeles, when he demonstrated that increasing the oxygenation of the skin by inhaling oxygen from a cylinder would relieve itching and cause temporary improvement in some cases of disseminated neurodermatitis. Dr. Belisario said that he had successfully employed that procedure himself. Such an improvement seemed feasible, since peripheral vasoconstriction occurred in widespread neurodermatitis. A number of other findings in the literature now supported that contention.

Dr. Waugh had referred to atopic dermatitis. Dr. Belisario said that there were various concepts of that condition. To him it was dermatitis, with a somewhat typical distribution and course, occurring in individuals who had, or who had had, such a form of dermatitis in infancy with periodical recurrences, and who might or might not have asthma

or hay-fever as well, or whose parents, brothers, sisters, uncles, aunts or cousins had a history of any of the foregoing three complaints as well. Such a condition could be due to an inherited predisposition to become hypersensitive or to acquire an altered capacity to react. Dr. Waugh had suggested that atopic dermatitis was greatly or even wholly associated with a sensitivity to proteins. Dr. Belisario thought that a number of other mechanisms must be considered, such as enzyme action, histamine release, changes in oxygen tension, nervous influences and hormone action. Bacteria could play a very definite role in causing dermatitis or eczema—for example, "infectious eczematoid dermatitis", such as could occur from direct contact with an exudate from a discharging ear, abscess or sinus. There it could be due to the bacteria, their toxins or to both. Likewise they could become superimposed on eczematitis, and either aggravate or potentiate the condition. In addition, even saprophytic organisms, which were found on the skin in large quantities in eczematotropic eruptions, possessed facultative eczematogenous properties, and could cause an eruption to persist or recur after withdrawal of the original noxa.

DR. LANCE HEWITT read some notes on behalf of DR. CLIVE SANDS, who was unable to be present. Dr. Sands said that from his point of view eczema was a condition that did not include such things as contact dermatitis. It was a true endogenous condition, and infantile eczema gave the most convincing picture. True infantile eczema lasted until about the age of six months. It was caused by something that the mother ate, and occurred in an infant susceptible to that type of reaction. Generally that condition settled down for a while, and then eczema reappeared, but it was then flexural eczema. It was quite a different condition. It was now caused by other foods than the mother's milk. Typically it appeared behind the knees and in the folds of the elbows. The treatment of the two conditions was different. The infant who developed flexural eczema was almost certain to continue throughout life with episodes of flexural eczema and/or asthma. True flexural eczema could develop at other ages than the first two years of life. In that case treatment would sometimes clear the condition completely, and sometimes it would follow the usual pattern of flexural eczema with episodes for the remainder of the patient's life. The treatment of flexural eczema of adults was different from the treatment of the condition in children.

Dr. Hewitt then said that the subject was one of great difficulty. The fact that so little was understood of the ætiology and physiology of the two most common human experiences, sleep and itching, showed how little the surface of medical knowledge had been scratched. Dr. Hewitt was in agreement with Dr. Waugh's remarks about the allergies of children; he said that he had always found the same three substances as the cause—egg white, closely followed by milk and wheat. When he was in private practice, he used to treat such children by taking them off cow's milk and giving them goat's milk, taking them off wheat bread and giving them rye bread, and excluding egg white from their diet; the condition cleared up dramatically. Dr. Hewitt referred to the value of skin tests, and said that it was usually possible to expose a child to a simple patch test. In his present work he was assessing reports on patients, and he was constantly disappointed at the lack of investigation carried out by dermatologists. Dr. Waugh had said that patch testing never seemed to reveal the cause of contact dermatitis. Dr. Hewitt said that patch testing was a type of challenge, and Dr. Waugh had recommended a challenge in investigation. Dr. Hewitt said that the tendency of the allergist was to dodge patch testing; it was tedious, unrewarding and frustrating. Dr. Hewitt said that surely efficient patch testing should reveal the cause of contact dermatitis. He urged the allergists to bend themselves to the task of evolving a more efficient technique of patch testing.

Dr. Havyatt said that he had some time previously declared himself forcibly in the Journal on the subject of eczematous dermatoses in infancy. He said that he deplored the term "infantile eczema". It was necessary to define exactly what was meant. Too often it meant either exudative infantile eczema or the dry type; they were two different conditions, with different causation. The exudative type was caused by gluttony. The changing of a child's feeding habits, and giving goat's milk instead of cow's milk, etc., simply meant giving the child food intelligently. If the gastric tract was overloaded, rosacea would occur. The dry type, on the other hand, was due to a genetic error. It was very common in the Chinese. By contrast, atopy was unknown among the New Guinea natives. Dr. Havyatt wondered whether the eczema that had cleared up by the time the child had reached the age of two years was due to education of the intestinal tract. He asked Dr. Waugh whether he really believed that all cases of infantile eczema were food allergies.

DR. C. F. ROBINSON said that the patch testing done by dermatologists was really a little bit better than Dr. Hewitt had said. If the cause of the eczema was known, the patch test would produce a positive result if some of the allergen was simply put on the arm and covered with "Viscopaste"; moreover, the reaction on other parts of the skin became aggravated. It was the unknown allergens that caused difficulty. The dermatologists had not fully explained what they could and could not do. It was very difficult to carry out tests against everything. Food tests were also difficult, and the dermatologists did not always agree with the allergists on those tests. However, the dermatologists could satisfy Dr. Hewitt's requirements, he felt sure.

Dr. Havyatt, in reply to Dr. Riley's questions, said that the diffusible substance had been called "H substance" by Sir Thomas Lewis, and others had called it by some other name. He thought possibly "histone" was the best name.

Dr. Waugh, in reply to Dr. Havyatt's question about the term infantile eczema, said that he did not like it either. He used it because he had been indoctrinated by the dermatologists. Referring to Dr. Havyatt's remarks about the over-loaded intestinal tract and gluttony, Dr. Waugh said that he thought the mothers would be resentful if it was suggested that every child with exudative dermatitis was a glutton. It seemed to him that a child who was a glutton with breast milk would be the same with cow's or goat's milk, and that proven good results after change to goat's milk could not be explained on the grounds of gluttony. Dr. Waugh finally said that he did believe that in all cases infantile eczema was a specific allergic disease.

Dr. Alexander, from the chair, thanked Dr. Havyatt and Dr. Waugh for their papers and those who had joined in the discussion.

Correspondence.

MEDICAL REGISTRATION IN NEW SOUTH WALES.

SIR: "Law is an order of reason." If an enactment is not in the order of reason, it is a violence, imposed by the will of the stronger (the State) upon the weaker (the citizen). The proper function of the State is to protect its citizens. Upon these great concepts of law and State the common-law of England was fashioned—the foundation of personal freedom, and Britain became "the envy of less happier lands". Today, Western civilization partakes of these freedoms.

Upon this background we might well review the *Medical Practitioners Act* and its application. By this Act, the State protects its citizens against unqualified medical practice. A reasonable means to this reasonable end is the granting of licence and registration to qualified persons. For it is persons who practise medicine.

During the first half of this century, the State exercised its proper function in this matter, charging an initial registration fee, to cover the necessary operations upon the register, two in number, the entry and its removal on death or misconduct. Degrees, over and above the necessary qualifying degree, could be registered on payment of an additional fee, but this was optional. The State properly confined its controlling to that which was necessary for the reasonable purpose of the Act. If a registered person wrote extra degrees after his name, he was not hunted.

But recently, the Act has obtruded in a new manner. A demand-notice is now sent, implying that some new danger, other than death or misconduct, threatens the removal of our names from the register, and that, to obviate any possibility of this, certain operations are necessary and are done annually, so that an annual charge must now be made.

One might well suspect the necessity for these operations, seeing that they were not necessary during fifty years. Perhaps they are not done even now, and perhaps the register is still treated conservatively. In either case, the suspicion remains, that medical practitioners are being charged for operations which are either unnecessary or non-existent. The question arises—what would be the attitude of the Medical Board to a practitioner charged before it with submitting accounts for unnecessary or non-existent operations, systematically and on a large scale?

In recent years, the money collected from initial registration fees has steadily increased, by virtue of the increasing number of medical men. But, over and above this, a sudden annual windfall of £5250 has been acquired from roll fees. Now, according to Parkinson's Second Law, the work of officials must expand to meet income. And according to his First Law, the same work must be expanded to fill added time available for it, for example, when extra office assistance is provided. So official work is now expanded, not only in hunting practitioners for their roll fee, but also in hunting some for extra money for extra degrees, regardless of whether the practitioner is already licensed and the public already protected—as though degrees practise medicine! Moreover, a new offence has been fabricated out of the arbitrary and artificial annual fee, namely, unpunctuality in payment of the impost. For this, the name is ticked off the register. When the "culprit" is finally run to earth, a double fee is exacted, the ticking off is cancelled, and the de-registration is de-registered.

An undesirable sequel is that our colleagues on the Medical Board are made to appear as tax-gatherers adding their bit to the rising tide of meddlesome bureaucracy, taxation and inflation. If they have been forced into this position, we owe them sympathy.

But they are under no statutory obligation to retain upon their demand-notice the statement that "this reminder is sent in your own interests, so as to obviate any possibility of your name being removed from the Register". This sentence implies that the demand for protection money is a benefaction. But such a demand can be a benefaction only if the threatened danger is extrinsic to the one making the demand. But when the danger stems solely from his will, or from that of his principal, and when the money is for himself or for his principal, then the demand is not a benefaction, but a demand for money under threat.

The Board owes it to themselves, as well as to us, to remove that tactless wording. For, when they are in the very act of exacting the tax, they are most falsely made to appear as though they were posing as benefactors, and thus mocking their colleagues.

The *Medical Practitioners Act* in its recent application has indeed defected grievously from the noble concept of law and State, adverted to at the beginning of this letter.

Yours, etc.,

235 Macquarie Street, Sydney.
November 17, 1960.

V. J. KINSELLA.

THE FATTY MEAL AND CORONARY THROMBOSIS.

SIR: According to Morris[1] the incidence of coronary atheroma has not increased over the last three decades; indeed, he remarks that "the population was absolutely stiff with mural atheroma before the First World War and at the end of the 19th Century". What appears to have increased is the incidence of thrombosis and consequent myocardial infarction. Recent work suggests that the phenomena of atheroma and thrombosis are two independent entities (Gresham and Howard[2]). The former can be induced in rats fed on peanut oil and adjuvants, and the latter, when the same animal is fed on butter and adjuvants—an instructive but not necessarily transposable experiment. The bulk of evidence still appears to favour Duguid's hypothesis, that atheroma is due to fibrin deposition on the intima of arteries, the end result of which is indistinguishable from atherosclerotic degeneration. However, the disparity between the constant incidence of atheroma and the increasing incidence of thrombosis calls for a reexamination of this theory.

Studies in England show that the hearts of heavy workers show half as much ischæmic fibrosis as those of light workers, despite the absence of significant differences in the incidence of coronary atheroma in the two groups (Morris and Crawford[3]).

Following a saturated fatty meal, it is widely recognized that some inhibition of the clot-clearing mechanism takes place (i.e., fibrinolysis is inhibited), and likewise it is clear that certain things promote fibrinolytic activity—namely, exercise, adrenaline, heparin, etc. Recent experimental work has shown that artificially induced fibrinolysis is capable of removing established thrombi, and studies on man are now being widely pursued (Clifton[4]). The anti-fibrinolytic activity of fatty meals has been demonstrated to occur within some three to five hours after the ingestion of the meal, and there is a greater delay in the clearing of visible lipæmia in patients with coronary artery disease compared to controls (Schwartz *et alii*[5]).

Exercise, in young people, taken within an hour after a fatty meal, and consisting of a three-mile walk, prevented the rise in blood coagulability induced by a fatty meal, compared to resting controls (McDonald and Fullerton[6]). Brief exercise gives only a short period of fibrinolytic activity (Biggs *et alii*[7]); but despite some reports, the exercise need not be violent (e.g., climbing a staircase 40 feet high three times produced evidence of active fibrinolysis—Biggs *et alii*[7]).

It would appear that, with the universality of mechanical transport in countries with a high standard of living, there has been a reduction in the daily physical activity of males in the age groups at risk, and hence a loss to the organism of the factor mentioned. In addition, in many western countries it is customary for the main meal of the day containing saturated fats to be taken last thing at night, and this would tend to produce a peak of interference with the clot-clearing mechanism during sleeping hours at a time when there is no exercise to offset this effect. One wonders whether it would not be better for us to take our main fatty meal during the day while we are physically active, allowing the beneficial effect of activity to promote fibrinolysis and so counter this possibly harmful situation.

Yours, etc.,

149 Macqarie Street, Sydney.
November 24, 1960.

Z. FREEMAN.

THE PATHOGENESIS AND MANAGEMENT OF SPINAL MYELOMENINGOCELE.

SIR: I was very interested in the article by Mr. Durham Smith on the pathogenesis and management of spinal myelomeningocele in your issue of November 19. I should like to make some comments based upon experience of the closure of 53 meningoceles and myelomeningoceles by myself over a period of 12 months in Sheffield, together with first-hand knowledge of the experience of three other people in closing a further 98 over an overlapping two-year period. Over the same period close follow-up studies were being carried out on approximately 120 other children, the survivors of several hundred cases presenting over about a seven-year period up to 1958. During this time also we began to perform ventriculo-atrial shunts, and my personal knowledge of this procedure amounts to about 80 cases.

Our custom was to operate on the myelomeningocele as soon as possible after birth; but not all cases were referred immediately, so that we had an opportunity to compare the advantages of immediate and delayed operations, and to assess the effects of delay varying from a few days to several months.

I would agree entirely with the arguments listed in favour of immediate operation, and would only differ in placing number 3 in number 1 position. However, I must disagree with the flat statement that "a number of myelomeningoceles are technically inoperable without rather elaborate plastic flaps in order to obtain skin cover". A moderate proportion will require a simple Z-plasty, a rather greater proportion just simple undermining, and a surprising number have surplus skin. A very small proportion really give any trouble in closure of skin, and I never found dural closure impossible.

As far as assessment of hydrocephalus goes, an accurate opinion is impossible at birth, and serial head measurements are the most practical method of determining progress. However, these can be misleading if the hydrocephalus is communicating, and the back has not been operated upon. A very slow increase in head circumference can go hand in hand with increasing cortical damage and an unclosed communicating myelomeningocele. Air studies give additional information, but unless repeated in serial fashion with some added risk to the baby, are not of assistance in prognosis.

[1] "Pathogenesis and Treatment of Occlusive Arterial Disease", 1959, Pitman, London: 142.

[2] *Lancet*, 1960, 2: 52.

[3] MORRIS, J. N., and CRAWFORD, M., *Brit. med. J.*, 1958, 2: 1485.

[4] *Amer. J. Cardiol.*, 1960, 6: 476.

[5] *J. Amer. med. Ass.*, 1952, 149: 364.

[6] *Lancet*, 1958, 2: 600.

[7] *Lancet*, 1947, 1: 402.

Natural arrest of hydrocephalus is, I think, very difficult to be sure about in the presence of an unoperated back, and in any event should affect the decision regarding a ventriculo-atrial shunt rather than closure of the myelomeningocele.

Finally, I would like to ask how one determines the potential usefulness of a month-old child, even conceding that he is paralysed from the waist down, with bilateral dislocated hips and gross club feet? Does the presence of these disabilities mean that the potential which may be present in his cerebral cortex must be allowed to wither slowly within an expanding skull, or to be strangled a little more quickly by meningitis?

Yours, etc.,

88 Russell Street,
Toowoomba,
Queensland.
November 27, 1960.

J. F. SANDER.

GIANT HÆMANGIOMA WITH THROMBOCYTOPENIA.

SIR: Concluding his report on "Giant Hæmangioma with Thrombocytopenia" (MED. J. AUST., 1960, 2: 815), the author advocates excision of large hæmangiomata to prevent thrombocytopenia, thus implying that the association is common, if not inevitable. On the contrary, the literature and the lack of it indicates that the syndrome is uncommon, and that the presenting cavernous lesions are very large, giant, or even multiple, usually. Surgical excision, short of mutilation, will be impossible at times, therefore, even by a master. In a study of 21 cases, Wilson[1] has shown that X-ray can be a very effective modality, but that it can fail. Surely it follows that each case must be treated on its merits. I would suggest that any rapidly progressive vascular tumour, in particular those exceeding 5 cm. in diameter, be investigated, and then treated if necessary, by a team comprising dermatologist, surgeon and radiotherapist, the patient thereby receiving the treatment he deserves.

The conservative approach to hæmangiomata follows no wave form, nor is it fashionable as the author suggests. It has been one aspect of the management of these lesions by the enlightened practitioner for many years, and will remain so, since it is based upon clinical facts, not impressions. (Simpson,[2] Lister,[3] Ronchese,[4] Van der Werf[5]).

Yours, etc.,

British Medical Association House,
135 Macquarie Street,
Sydney.
November 22, 1960.

LEWSBE ABBOTT.

AMNIOCENTESIS IN HÆMOLYTIC DISEASE OF THE NEWBORN.

SIR: We found the article by Dr. Cary in your Journal of November 12, 1960, most interesting. However, we would like to disagree with some of his statements.

Firstly, he fails to explain why the curves in Figure I fell. He states that a fall in the bilirubin level in an affected infant is unlikely. Is this statement true? The liquor amnii can only reflect in some crude way the degree of hæmolysis occurring in the fœtus. What is being measured is the presence of some of the breakdown products of this hæmolysis as they enter the liquor. The liquor and its constituents are continually changing, and the bilirubin is removed, presumably by the placenta, but at present little is known of the mechanisms involved. Thus the curves will vary from day to day and may fall even in the most severely affected cases. We have found such a fall in a number of cases where an affected baby was subsequently delivered.

Secondly, we fail to see any indication for further amniocenteses in the case mentioned in Figure I. The curves in this figure were undoubtedly falsely high, as the fluid was not filtered before examination. In all cases quoted in this series the amniotic fluid was simply centrifuged and examined in the spectrophotometer. We now believe that after centrifugation the fluid should be filtered before reading, as small particles in the fluid result in a falsely high curve. Thus in the case under discussion further amniocenteses would have only given further false impressions of the condition of the fœtus. At this stage we feel that multiple amniocenteses, although still practised by us at King George V Hospital, may be unnecessary, and that in the future all predictions may be based on a single examination at 30 to 32 weeks. Further knowledge of the physiology of the liquor will undoubtedly prove most helpful in our work.

Yours, etc.,

R. S. HYSLOP,
W. WHILEY,
Registrars.
King George V Memorial Hospital,
Camperdown,
N.S.W.
November 24, 1960.

[1] *A.M.A. Arch. Derm.*, 1960, 81: 432.
[2] *Lancet*, 1959, 2: 1059.
[3] *Lancet*, 1938, 1: 1429.
[4] *Amer. J. Surg.*, 1953, 86: 376.
[5] *Ned. T. Geneesk.*, 1954, 98: 676.

AUSTRALIAN PÆDIATRIC ASSOCIATION: CHILDREN IN HOSPITAL AND PÆDIATRIC EDUCATION.

SIR: A perusal of the Australian Pædiatric Association's excellent report on children in hospital (M. J. AUST., November 19) prompts me to raise a matter which, although not strictly within the terms of reference of the sub-committee issuing the report, is closely related and might merit consideration. I refer to the provision of hospital accommodation for the mother of the very young child who has to be hospitalized.

It is now generally accepted that separation from his mother, even for short periods, and particularly at times of stress, may inflict serious psychological trauma on a young child. This outlook has led to the provision of individual mother-child units in many pædiatric centres, and the more general provision of such accommodation is recommended in the Platt Report (H.M.S.O., 1959).

The average country hospital, lacking though it may be in many desiderata for the specialized care of children, is usually able to offer this facility, and I always prefer the mother of a young child to remain with him in hospital if practicable. However, at present there is a serious financial obstacle to this procedure. The parents have to pay for occupying two hospital beds. If there were sufficient feeling amongst the profession in favour of hospitalizing mother and child together, in appropriate cases, surely the hospital authorities could be prevailed upon to modify their charges, or the Hospitals Contribution Fund to augment their reimbursements in such cases.

Yours, etc.,

Carcoar,
New South Wales.
November 21, 1960.

M. C. SPENCER.

SODIUM FLUORIDE AND CHILDREN'S TEETH.

SIR: We see many arguments for and against the fluoridation of water supplies.

For just over five years, following on the advice of one of the local dentists, I have been prescribing sodium fluoride tablets, one daily of 2·2 mg., to all my patients during the ante-natal period. Over a hundred mothers have had this treatment, and the first children since I followed this procedure are now four and a half years old.

The results are uniformly good. I have only seen one small cavity so far. The teeth are regular and evenly spaced. In some families where the older children have not had this treatment, they have shocking teeth and the teeth of the younger ones are perfect. I am also giving the sodium fluoride tablets to the children for their permanent teeth, 1·1 mg. up to the age of one year and 2·2 mg. until the age of three; as yet I have not had the opportunity of seeing the results. All the teeth except the wisdom teeth are formed at this age.

I think that this preventive measure for the preservation of children's teeth is worthy of investigation by those who could use far greater numbers in a survey.

Yours, etc.,

137 Faulkner Street,
Armidale,
N.S.W.
November 22, 1960.

ELLEN KENT-HUGHES.

Obituary.

ROBERT ANTHONY HOWETT.

WE are indebted to DR. F. P. MORGAN for the following account of the career of the late Dr. R. A. Howett.

The unexpected news of the death of Robert Anthony Howett on March 19, 1960, came as a shock and saddened his many friends here and abroad. He had expected to come home in October after a sojourn of five years in the United Kingdom and Europe, where he had studied general surgery, had gained his fellowship and had undertaken special training in neurosurgery with Professor Norman Dott of Edinburgh. A visit to the main neurosurgical centres of Europe was to conclude his studies. Early on a misty Scottish morning, on his way back to the Royal Infirmary, Edinburgh, from an emergency head injury operation, he was killed instantly in a motor-car accident.

At St. Vincent's Hospital, Melbourne, we were looking forward to his appointment as assistant neurological surgeon. In the ordinary course of events this would have come soon after the department of neurosurgery moves its new quarters to the recently completed Berchmans Daly Wing of the Hospital. He would, therefore, have entered on his neurosurgical career in Melbourne at a new phase in the development of St. Vincent's Hospital. He was to leave Edinburgh, where a new era was also beginning. The formal opening of Professor Dott's new Department of Surgical Neurology at the Western General Hospital, Crewe Road, Edinburgh, was held on June 29 to July 1, 1960. This is a grand department, unrivalled in the British Isles, and was designed with meticulous care by Professor Dott. From Europe and the British Isles and America distinguished neurologists and neurosurgeons gathered, and the main topic of the meeting was diencephalic surgery, in which stereoataxic procedures have become increasingly important. Bob Howett had the opportunity to study this branch of surgery, and to become skilled in its application, for the Edinburgh School was well in the foreground and had achieved much success in treatment.

I met Bob first of all when he attended undergraduate clinics for neurosurgery in 1950. In those years neurosurgery was not considered important in the student's training. Bob stood out by his stature, brightness and wit, and could always give a good account of the patient and make a reasonable diagnosis. After graduation he came straight away to my clinic as resident and then as registrar, and remained two years. He developed a liking for neurosurgery and a real capacity for the clinical and operative work. His records and comments and letters of these days were first-class, and tell of a sound education founded on classical lines. A merry wit and succinct description enlivened his pages, as I rediscover on reading them in preparation of the first Arthur Schüller Memorial Lecture on "Aneurysms of the Intracranial Carotid Artery". His work brought him in contact with the sporting world, and he became medical officer of the North Melbourne Football Club, a position he relinquished with regret when he went overseas.

His next medical appointment was to the Royal Children's Hospital, where he spent a profitable and enjoyable year. About this time he suffered much incapacity from a mysterious intermittent hydrarthrosis of the knees, which could have jeopardized his future career as a neurosurgeon. After full consideration he decided to carry on, only to suffer a recrudescence in Edinburgh, where he had gone for the primary F.R.C.S. examination. In London, where he took the final F.R.C.S. examination, he was cured of the hydrarthrosis by repeated intraarticular injections of cortisone, and so he was able to return to Edinburgh, where he was accepted by Professor Norman Dott for training in surgical neurology. He found the first months trying and disappointing. He longed for home. He was junior to all in a large department, where his responsibilities were few and minor.

Gradually the scene changed; he moved up the ranks, and under the careful guidance of Professor Dott and his assistants, he received a first-class training; he developed considerable skill in stereotaxic brain operations with the Guiot-Gillingham apparatus. This was to be his special strength on his return home, and we looked forward to learning much from him.

The story of his life, from his entering the medical school at the University of Melbourne until the completion of his studies abroad, traverses thirteen years. The training required today for a medical or surgical specialist is long and arduous, and the sacrifices he and his family make are considerable. Most are spared to enjoy the fruits of their long years of preparation and to bring some satisfaction to their families, who have assisted during the long wait. For Bob this was not to be. Providence ordained that he should not see the fulfilment of his desires, ambitions and labours. To his mother and father, sister and brother, the sincerest sympathy is offered.

In another part of this obituary notice, reference is made to a letter by Professor Dott. That letter tells admirably of the fine character and personality of Bob, and of his potentialities. All this I can endorse, and I pay special tribute to his unswerving loyalty. One may note in this letter the interest of our colleagues abroad in the young doctors who leave these shores for study, and the care and attention they give them. A note from Dr. Gillingham is appended below.

Requiem Mass was held at Xavier College, Melbourne, on Saturday, September 3, prior to the funeral at Kew Cemetery. In closing this memoir, I feel that I cannot do better than use the words of an American colleague who recently recorded the life of an esteemed Canadian neurosurgeon: "We saw him come; we felt him go."

DR. ERIC SEAL writes: I should be grateful to have the opportunity in your columns to pay this last tribute to my friend the late Dr. Robert Howett. The news of his tragic death in Scotland has come as a cruel blow to his many friends in this country, and especially to those who had the privilege of being closely associated with him.

He died at the age of 31, on March 19, 1960, on the threshold of a most promising career, for which he equipped himself with admirable patience and self-discipline. He had prepared the soil lovingly and well, and it is our irremediable loss that we shall never be able to share the fruits of his careful labours. It was not to be; but we are the richer for the example of his life, and of his work, albeit unfinished.

It was a good life in every way, tinged, but not marred, by suffering and disappointment. He had his full share of sickness and frustration, of loneliness and uncertainty; but the strength and stability of his personality triumphed over all these hardships. He was gifted with a keen sense of wit, which illuminated his conversation and also his

letters; these were numerous and always a joy to read. He hated humbug and pretence and sophistry, and his humour had a sharp edge at times, when he felt there was a need for it. It could be said of him as truly as of Gilbert, "His foe was folly and his weapon wit". Short as it was, his life epitomized all that is best in the traditions of medicine—hard work, a keen sense of duty, unselfish devotion to his patients, self-reliance, an admirable self-discipline and, above all, a warm and wholesome loyalty to his friends and to his teachers.

He was educated at Xavier College, and matriculated with high honours in the classics and English. He enrolled as a medical student at the University of Melbourne in 1946, and graduated in 1951. He was a resident medical officer at St. Vincent's Hospital, Melbourne, during the period 1952-1953, and I was fortunate to be associated with him during that time in the Neurosurgical Unit, where we both enjoyed the warm friendship and benevolent wisdom of our chief, Mr. Frank Morgan. Mr. Morgan's work and his personality had a profound influence over the young registrar, who was inspired to make neurosurgery his own life's work.

After spending an enjoyable year at the Royal Children's Hospital (during which time he was also the energetic and extremely popular medical officer to the North Melbourne Football Club), he sailed for England in 1955.

He had a cultured mind, and enjoyed his periodic trips to Europe to see the glories of the great capitals; but his artistic sensitivity was combined with a practical and delightful sense of fun, which made him a very entertaining travelling companion. He did not talk of his musical talents, and not many of his friends knew, for instance, of the small organ that he installed in his flat in Edinburgh. Yet I recall his saying, with his characteristic gesture of adjusting his spectacles, that the sweetest music he had heard in England was the rattle of Compton's stumps in one of the Tests, to the bowling of Keith Miller.

He was an enthusiastic host, and the warmth of his hospitality to Australian visitors will be gratefully remembered by many of us. I shall cherish the memory of our last dinner party when I was in London in the spring of 1958. It was two years, to the day, before his death. My last glimpse of him was through a fog at London Airport, where he had driven us for our departure—a kindness which he had shown to countless others.

In 1958 he was made a Fellow of the Royal College of Suregons of England. He had schooled himself well and gained a very sound knowledge and experience in general surgery before turning to his chosen specialty. To his great delight, he was accepted as a member of the Neurosurgical Department of the Royal Infirmary, Edinburgh, under Professor Dott. It was obvious from Professor's Dott's correspondence, as well as from his own, that a mutual respect and admiration was soon established between them.

In a letter to Mr. R. L. Howett, senior, dated March 21, 1960, Professor Dott wrote as follows:

> Having won his Surgical Spurs in England we were glad and privileged to take him on here for Specialist training and experience in brain surgery.
>
> He proved his worth from the first and was shouldering increasing responsibility of which he was so capable by natural endowment and by well judged training. He was so loyal to his colleagues here, so keen on all developments and activities of our Department, so kind and considerate to patients. He was an excellent teacher of his juniors, too, and with a charming kindly sense of humour.
>
> I had no doubt that a few years would see him a leader of Neurological Surgery in Australia. He was ambitious in the best sense. When you read this you will have heard how it happened—in the loyal conduct of the arduous professional duties that he loved. The one small comfort is that it was evident that he cannot have known anything of the accident—only hastening back to his next day's work with his patients.
>
> For his colleagues here in Edinburgh we are grateful to have known such a man and to have had him among us; and we are devastated by his loss, and the loss of his great promise to Neurological Surgery; though he had many scores to his credit already.

But his influence was felt beyond the confines of the wards and the hospital. He had the gift of reaching the hearts of his patients, and especially of children, and of exerting an influence in their lives far beyond the call of medical duty. I well remember the delight it gave him to buy a Hornby train for a little patient at St. Vincent's; and it is an ennobling experience to read, as I was privileged to do, the moving tributes sent to his parents after his death by complete strangers who had benefited by his kindness and skill. It is typical of him that they came from people in all stations of life, for this was one of his greatest attributes—the ability to meet all men on their own level with no hint either of subservience or of condescension.

His death has come as a most sad loss to us who were his friends and colleagues; but our loss cannot compare with that suffered by his family, to whom he was greatly devoted. May God, Whom he served so faithfully, comfort them in their sorrow, and may he rest in peace.

MR. JOHN GILLINGHAM writes: Robert Anthony Howett, or Bob Howett, as he was known to all of us in Edinburgh, was just completing his registrarship in surgical neurology when he met with his tragic death in a road accident. He had the promise of a particularly bright career in neurosurgery on his return to Australia in August, 1960, and great is the loss to medicine of this fine young man.

It is always refreshing to have an Australian on the staff of a British unit, and Bob Howett was no exception. His charm lay in a good mixture of attractive shyness, a frank direct approach to problems and people, and a great concern for patients. I subsequently learned of many instances of his practical kindness to patients and their relatives outside hospital. He and his fellow-registrars in the Department of Surgical Neurology in Edinburgh created a particularly happy period in our history, and we all share with his relatives a deep sense of personal loss.

DR. JOHN FARRAR writes: On meeting Robert Howett there was none of that awkward conversation which sometimes marks a first encounter. His conversation was from the beginning warm, frank, humorous and understanding.

While continuing to love his own country and the city of his birth even to the extent of tilting at that city's closest rival, he strove to appreciate the way that other people thought and lived. And this applied as well to his patients and his friends as to the people of the many countries which he visited while learning and practising surgery in the United Kingdom.

A tireless traveller and worker, one could not have wished for a more genial companion or more genuine friend.

HENRY FRANCIS HERBERT ELVINS.

WE are indebted to Dr. A. E. Rowden White for the following account of the career of the late Dr. H. F. H. Elvins.

On August 29, 1960, Dr. H. F. Herbert Elvins passed away after a brief illness, aged 85 years. He was a general practitioner, and in latter years he laughingly considered he belonged to a disappearing art, since the introduction of group practice. However, we could not accept this little joke because his record was so excellent.

Herbert Elvins was born at Campbell's Creek in 1875. He was the son of a school-teacher, and was educated at Geelong College and the University of Melbourne. After qualifying in 1898, he accepted the position of superintendent at the Ararat Hospital with the right of private practice for one year. Next he accepted a position of resident medical officer at the Alfred Hospital, Melbourne, for two and a half years, and then followed a similar position for another two and a half years at the Women's Hospital. He then built a home in La Trobe Terrace, Geelong, to enter into private practice, in which he remained from 1904 to 1949. During this period he became an honorary medical officer at the Geelong Hospital, and was for several years senior surgeon, and for a time in charge of the radiography service. He did war service in Egypt from 1916 to 1919 at the 14th Australian General Hospital, Egypt, and specialized in radiology there, with the rank of captain.

Elvins had also been a member of the Geelong Hospital Committee for 25 years up to the time of his death. He retired from practice ten years ago. He was a well-known tennis player, and played with Corio Club team for many years. He was also a keen cricketer and fisherman. He married Ethel Maud Biggs in 1920. We send our sincere sympathy to his widow and family in their great loss.

Notes and News.

An Honour for Sir Roy Cameron.

It has been announced (*British Medical Journal*, November 19, 1960) that Sir Roy Cameron, F.R.S., has been awarded the Royal Society's Royal Medal for his distinguished contributions in the field of cellular pathology. Sir Roy, who is professor of morbid anatomy at University College Hospital Medical School, London, was born in Victoria and is a graduate in medicine and a doctor of science of the University of Melbourne.

Election of Officers for the Australian Association of Ethical Pharmaceutical Manufacturers.

At its annual meeting in Canberra on November 17, 1960, the Australian Association of Ethical Pharmaceutical Manufacturers elected the following officers for the year 1960-1961: *President*, Mr. E. J. Willis (N.S.W.); *Vice-Presidents*, Mr. A. K. Hobbs (Victoria) and Mr. P. A. Smith (N.S.W.). *Councillors*, Mr. G. V. Scammell (S.A.), Mr. F. Gilbert, Mr. G. G. Hunt and Mr. E. W. Lowe (Victoria), and Mr. J. P. de Haseth, Mr. J. T. Hook, Mr. E. A. Lum, Mr. F. M. Needham, Mr. T. J. White and Mr. D. B. Willmott (N.S.W.).

Androstanolone Placed on Restricted List.

The Minister for Health, Dr. Cameron, has announced that the drug androstanolone, placed on the pharmaceutical benefits list on November 1, 1960, is to be transferred to the restricted use category. Dr. Cameron said that steps had been instituted immediately, on the advice of the Pharmaceutical Benefits Advisory Committee, to alter the listing of the drug, and the restriction on its use would apply from January 1, 1961. When androstanolone, which costs the Government £12 6s. 9d. per prescription, was placed on the pharmaceutical benefits list, it was intended to be used for treatment of cancer of the breast. However, in the few weeks during which it had been listed, it had been widely prescribed for more common conditions, for which much less expensive drugs were appropriate. Reports from chemists and inquiries by his own officers indicated that a very considerable expenditure of public money would take place unnecessarily unless prompt steps were taken to restrict the use of androstanolone to its intended purpose. The Minister said the amendment of the regulation, the notification of doctors and chemists and other formalities made it impossible to restrict the use of androstanolone before January 1. He hoped that the early announcement of the Government's intention would draw doctors' attention to the importance of not prescribing the drug unnecessarily between now and January 1, 1961.

Royal Society of Edinburgh: David Anderson-Berry Prize, 1961.

A David Anderson-Berry silver-gilt medal, together with a sum of money amounting to not less than £100 sterling ($280), will be awarded in 1961 by the Council of the Royal Society of Edinburgh. The prize will be awarded for recent work on the effects of X rays and other forms of radiation on living tissues. Published work will be taken into consideration if submitted to the Society with the application. In addition to direct application for the prize, proposals may be made on behalf of others. Applications and proposals must be in the hands of the General Secretary, Royal Society of Edinburgh, 22/24 George Street, Edinburgh, 2, Scotland, not later than March 31, 1961.

Medical Matters in Parliament.

HOUSE OF REPRESENTATIVES.

THE following extracts from *Hansard* relate to the proceedings of the House of Representatives.

November 15, 1960.

Aborigines.

MR. BEAZLEY: I wish to ask the Prime Minister a question. Will he consider a referendum, coincident with the next federal general election, to alter placitum (xxvi) of section 51 of the Australian Constitution by deleting the words "other than the aboriginal race" in order to remove the prohibition on the Commonwealth's legislating for this race?

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED NOVEMBER 5, 1960.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	3(2)	3(3)	..	1	..	1(1)	..	..	8
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	2	..	..	..	..	..	3	..	5
Anthrax	..	2(2)	..	..	..	..	..	..	2
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	1	..	..	..	..	..	..	2
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1	..	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	1	15(9)	9(7)	..	..	..	1	..	26
Diphtheria	1	..	1	..	..	..	..	..	2
Dysentery (Bacillary)	..	..	..	..	..	..	2	..	2
Encephalitis	..	2(2)	..	..	..	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	2	..	..	..	..	..	..	2
Infective Hepatitis	155(63)	78(44)	21(10)	56(36)	17(13)	..	1	7	335
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	..	..	..	..	..	..	..
Malaria	..	..	2(1)	..	1(1)	..	1	..	4
Meningococcal Infection	..	..	..	..	..	..	..	..	..
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	1	..	..	1
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	2	..	..	..	1(1)	..	..	3
Puerperal Fever	..	..	1	..	..	..	..	..	1
Rubella	..	12(8)	1(1)	4(1)	3(2)	..	..	..	20
Salmonella Infection	..	..	..	..	1(1)	..	..	..	1
Scarlet Fever	4(3)	35(15)	4(4)	..	..	1	..	..	44
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	1	..	..	..	..	..	..	1
Trachoma	..	..	..	..	15(9)	..	1	..	16
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	24(16	26(19)	6(2)	6(4)	7(2)	..	..	1	70
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Further, in view of the fact that in world affairs, where race issues are sharpening, the Commonwealth is in fact held responsible for aboriginal welfare, will the right honourable gentleman assist States to take steps necessary to lift the standards of aboriginal welfare generally at least to the standards of the Northern Territory, and will he consider altering the official objective from the abstract one of assimilation to that of the physical survival of aboriginal people as a distinctive people living in circumstances of full human dignity?

MR. MENZIES: The question is an interesting one, but it relates to a matter of policy on which I would not endeavour to make an offhand reply.

Alcoholism.

MR. FOX: I ask the Treasurer: Has he seen a report, attributed to Dr. Leonard H. Ball of the Alcoholism Foundation of Victoria, to the effect that on the average one worker in 33 is either a problem drinker or an alcoholic? Is he aware that it has been reliably estimated that alcoholism costs the Australian community £100,000,000 a year, excluding the cost to industry? Will the right honourable gentleman give consideration to setting aside an amount of money, equivalent to 1 per cent. of the amount collected by way of excise duties on beer and spirits, as the foundation of a fund for research into the disease of alcoholism?

MR. HAROLD HOLT: I have not seen the report to which the honourable member has referred, but I am aware that alcohol can be a liability as well as the undoubted asset that it is in the view of many people in this country. It is suggested that additional finance should be provided to combat the problems of alcoholism. That is a matter of policy, which would not come directly to me in the first instance. The hypothecation from a revenue source of funds for a project which may, by some process of association, be related to that source has never commended itself to this Government, and I cannot give the honourable member any encouragement in that matter.

National Health (Pharmaceutical Benefits) Regulations.

MR. WHITLAM asked the Attorney-General, upon notice:

1. On what date did the Parliamentary Draftsman receive instructions to prepare amendments of the National Health (Pharmaceutical Benefits) Regulations which were notified in the *Commonwealth Gazette* on the 28th October, 1960?

2. On what date did the Draftsman dispatch the amendments?

SIR GARFIELD BARWICK: The answers to the honourable member's questions are as follows:

1. The first instructions were received on 1st August, 1960; further amending instructions were received on 2nd September, 1960.

2. 30th September, 1960.

The College of Radiologists of Australasia.

FELLOWSHIP OF THE FACULTY OF RADIOLOGISTS OF LONDON.

BETWEEN October 10 and 23, 1960, Professor D. Waldron Smithers, President of the Faculty of Radiologists of London, and Dr. E. Rohan Williams, Warden of the Fellowship of the Faculty, visited Melbourne and conducted examinations for the Fellowship. Entries had been received from 32 candidates, of whom 26 presented themselves for examination, 19 in radiodiagnosis and seven in radiotherapy. Professor E. S. J. King, of the University of Melbourne, acted as examiner in pathology; Mr. Stanley F. Reid, nominated by the Royal Australasian College of Surgeons, examined in surgery; Dr. Keith Fairley, nominated by The Royal Australasian College of Physicians, examined in medicine. The following Australian candidates satisfied the examiners and gained the Fellowship of the Faculty:

Radiodiagnosis: Dr. W. R. C. Bennett, Dr. J. Kalokerinos, Dr. J. M. McKenna, Dr. L. V. Perrett.

Radiotherapy: Dr. T. F. Sandeman.

Deaths.

THE following deaths have been announced:

POOK.—William Pook, on November 24, 1960, at Lismore, New South Wales.

DENEHY.—William John Denehy, on November 24, 1960, at Melbourne.

FISHER.—Bernard Fisher, on November 29, 1960, at Sydney.

Diary for the Month.

DECEMBER 12.—Victorian Branch, B.M.A.: Executive Meeting of Branch Council.

DECEMBER 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee. Medical Politics Committee.

DECEMBER 16.—New South Wales Branch, B.M.A.: Ethics Committee.

DECEMBER 20.—New South Wales Branch, B.M.A.: Hospitals Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

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